ATARI EXPLORER

THE OFFICIAL ATARI JOURNAL

Sept/Oct 1986
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Canadian

NEW AND IMPROVED!
(See Editorial, Page 6)

To The Future:

WHAT'S AHEAD FOR ATARI?

Most-Asked Questions About The ST
Tutorial: Painting With Light
Insuring Your Computer
How Much Will That Condo Really Cost?
User Groups Plan Shows
Programming Challenge
Report From CES

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- DBMan
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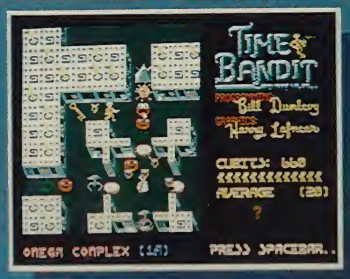

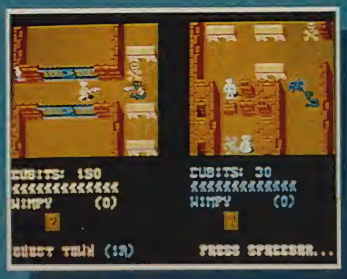

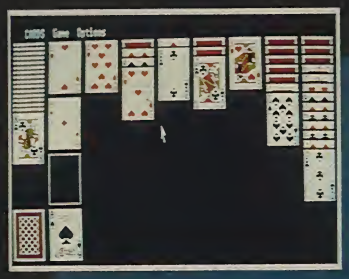

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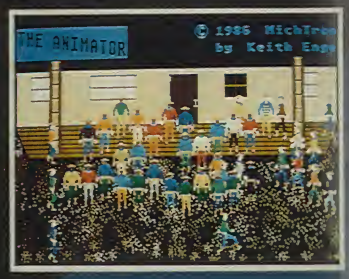

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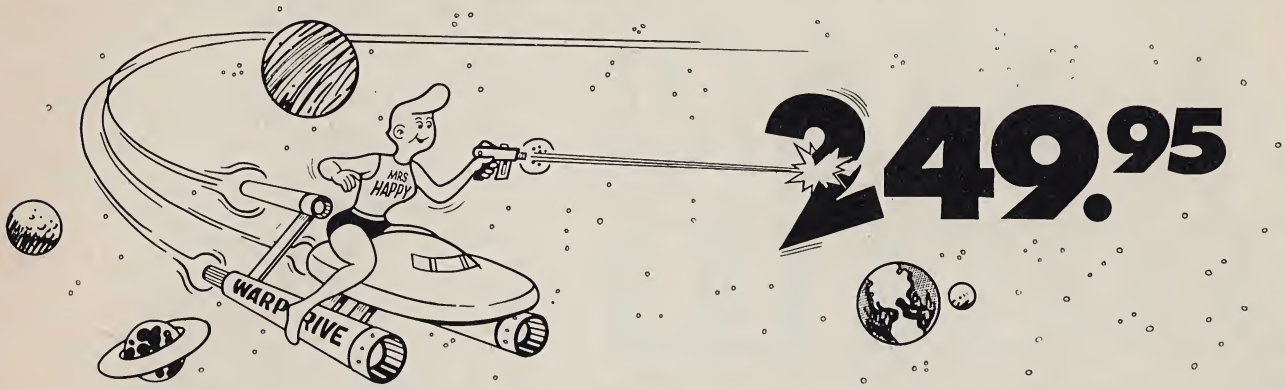

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Cover: Photograph by Jeff MacWright

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Scofflaws beware; the future of CD-ROM

News & Views

By DAVID H. AHL

High-Tech Sting

Despite the enactment of computer crime laws in most states, fewer than 100 cases have been prosecuted. Moreover, of the computer criminals who are prosecuted, few ever go to jail or pay major fines. However, from the prosecutions, some interesting facts emerge. Most crimes are committed by programmers, students, and input clerks with an average age of 22. The most common targets for malicious tampering are commercial companies, banks, telecommunications companies, and government agencies; the average incident causes $93,600 of damage.

As a result of the growing frustration in trying to track down malicious hackers, police agencies throughout the U.S. have set up "underground" electronic bulletin boards. One, devised and run by Sgt. Dan Pasquale of the San Francisco Police Department, attracted a large collection of systems passwords, account numbers, and long distance access port codes. Recently, seven suspects in the Silicon Valley area, none older than 18, were arrested and charged with possession of stolen property and trafficking in unauthorized credit card numbers and long distance access codes.

Another similar bulletin board, the Underground Tunnel, was set up by Sgt. Robert Ansley of the Austin, TX, Police Department. Ansley, who called himself Pluto on line, said, "We were very careful not to solicit or entrap anyone into leaving illegal information." But leave it they did. In just a few months, the board contained many access codes and passwords including some belonging to TRW Information Systems, the world's largest credit reporting organization. Many of the offenders were students at the University of Texas, some of whom complained that they had been entrapped and their privacy had been violated by the police, an ironic complaint from people engaged in maliciously violating the privacy of other people and companies.

Pirate Zappers!

Meanwhile, the past few years have also seen a sinister increase in the number of "Pirate Boards," BBS systems that make the illegal transfer of copyright software their stock in trade. "It's amazing." Said the chairman of a New York Atari users group who asked not to be identified, "Pirate boards in New York alone must number in the hundreds." The boards, with names like "Jolly Roger" and "Skull and Crossbones," act as illicit trading posts both for software and for tips on "cracking," the black art of defeating software copy-protection schemes.

But software publishers have started fighting back. Last month, a consortium of 12 publishers, working under the aegis of the prestigious Software Publishers Association, shut down a notorious pirate BBS in Cincinnati. At the time of the arrest, the "Star Chamber" BBS was alleged to contain almost 40Mb of copyrighted software, most of it for Atari 8- and 16-bit systems.

The 12 publishers (11 of whom produce software for Atari computers) are Antic Software, Batteries Included, Digital Research, Hippopotamus Software, Infocom, Michtron, Megamax, Quickview Systems, Quantum Microsystems, Procopy, Regent Software, and Xlent Software. In a joint statement issued after the arrest, the members of the consortium vowed to continue pursuing legal action against pirate boards and other centers of the illicit software trade. Gordon Monnier, president of Michtron, Inc., added: "We're all fed up with tolerating theft of our products, and we intend to go after these scofflaws aggressively."

CD-ROMs Poised to Grow?

A CD-ROM is a 12-cm compact disk that can store a combination of digital images, data, audio, and computer code. Read by a laser, CD-ROM disks, unlike floppy disks, have only read capacity.

To date, only 11,000 CD-ROM players have been shipped worldwide; the majority of them have gone to developers and system integrators. At a recent CD-ROM conference sponsored by Microsoft, over 900 developers and publishers gathered to talk and hear about the latest projects. Most agreed that there are few commercial products to attract the average user today, but that the market is poised on the verge of enormous growth.

Gary Kildall, creator of the CP/M operating system and co-founder of Digital Research, was the keynote speaker at the conference. A leading proponent of videodisc technology, he has started a new company, KnowledgeSet Corp., which recently introduced a CD-ROM electronic encyclopedia. His company has also established a joint venture with Sony in which KnowledgeSet will offer data preparation services and Sony will master and reproduce the disks. Kildall believes that the key to making CD-ROMs successful is to make it very easy for existing publishers to transform their current materials into CD form and then work with them to take advantage of the multimedia capabilities.

Most CD-ROMs currently available are specialized databases. Datext markets five business information databases, Knowledge Access markets two disks ("Who's Who in Electronics" and "Your Marketing Consultant"), and Amtec provides automotive maintenance manuals on disk.

Thus it appears that the ball is rolling (or the disk is spinning) and that industry forecasts of sales of 75 million disks by 1990 may be realized. ■

ATARI EXPLORER

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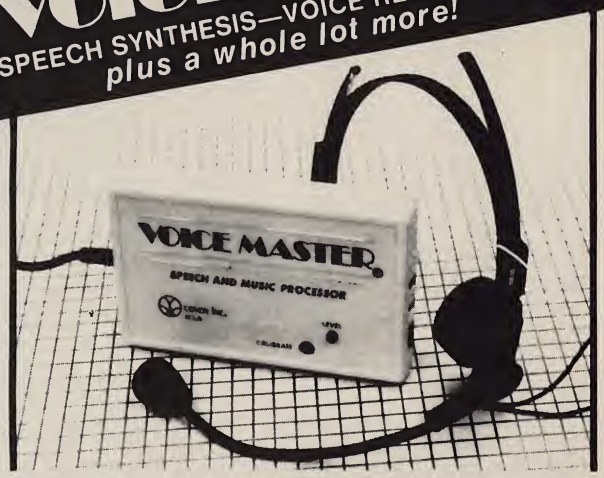

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Editorial

By DAVID H. AHL

"New and improved." Walk through any supermarket and you will see these words on a good percentage of the boxes, cans, and jars on the shelves. According to marketing executives, they are two of the five most compelling words in the English language (the others are *free*, *save*, and *special*).

Unfortunately, these words are so overused that we have become inured to them. Consequently, I hesitate to say that *Atari Explorer* is new and improved. Would refreshed and enhanced sound better?

Cutting through the hype, all too often "new and improved" means that the percentage of perfume in a liquid detergent has been increased from 3.2% to 3.3% or that a cereal box has been made taller and wider (but half the depth) of the old box to make it appear larger. The changes in *Atari Explorer* are considerably more substantive than that. Some of them are obvious in this issue; others will become evident as time goes on; and still others are invisible to you readers but nevertheless quite important. Let's look at a few of the ways in which *Atari Explorer* is new and improved.

New Management and Staff

Look at the masthead and you will see some familiar names. Betsy Staples, editor, was formerly the editor of *Creative Computing* and, having been with *Creative* since 1978, brings a rare depth and perspective to *Atari Explorer*. You will quickly find that her fanatic devotion to making articles readable and understandable will elevate *Atari Explorer* to the level of the highest quality magazines in America.

John Jainschigg, senior technical editor, was for three years the senior technical editor of *Family Computing*. John is another fanatic; in his case fanaticism is directed at making sure not only that every published program works under every conceivable condition, but that the logic is clear and the code structured (or at least not convoluted) and well documented. John devotes this same attention to detail to hardware articles, technical tips, reviews, and product specifications.

Our contributing editors are of equally high caliber: Tim Onosko, John Anderson, Edward Carlson, Bill Jacobson, and Bill Kokoni. You have undoubtedly seen their names in *Omni*, *Discover*, *Byte*, and *Creative Computing*; now you will see them in *Atari Explorer* as well.

Peter Kelley, art director, is another name you will remember from *Creative Computing*. Not your average art director, Peter has a degree in fine arts with a minor in physics and has a good understanding of the material in the magazine. This, combined with his artistic flair, leads to a sharpness and clarity in layout and design that enhance the visual presentation of our articles and makes them as clear and interesting as possible.

Pamela Fedor, advertising sales, is also no stranger to the industry. She has sold advertising for other personal computing magazines, and computers are part of her daily life. Other advertising sales people I have known have felt their job was limited to space sales; they never bothered to learn about the magazine they were selling or the products that were being advertised. To them, selling space in *Atari Explorer* would be the same as selling space in *Family Circle*. Not to Pamela. She regularly uses word processing, database, and spreadsheet programs, and her children use entertainment and educational software. She is truly "one of us"—a fact that advertisers will appreciate.

Publication Frequency

Atari Explorer will be published bimonthly—that means every other month—starting with this issue. We will be making up about one week per issue until subscribers are receiving the current issue during the first week of the cover date, e.g., the March/April issue would be mailed the first week of March.

This is Your Magazine

We hope you consider yourself an important member of the *Atari Explorer* family. Like so many busy families today, we haven't been communicating with each other very regularly. We would like to change that. Step one: fill out and return the brief questionnaire on the next page. Please feel free to write a letter along with it, expanding on any of the topics or telling us about your interests.

Step two: write for *Atari Explorer*. Share your ideas, your programs, and your tips. Some ground rules: everything you send to us—even letters—should be typed (or printed on a printer) double spaced with ample margins (use 64 characters or less per line). Illustrations, screen photos, program listings, and figures are your responsibility. (We may re-draw things, but an artist can do a much better job working with high-quality original material.) Programs should be included in machine-readable form, preferably on disk. Also enclose a self-addressed stamped envelope with sufficient postage for return of your material if you want it back. Our goal is to turn around (accept or reject) articles within two months. Oh yes, our rate of pay is comparable with other industry magazines.

Feel free to send us a query about an article before doing it, but please don't call us—we just don't have the people power to answer telephone inquiries.

We are looking forward—with your help—to bringing you the best magazine in personal computing. ■

Who Are You?

If you have read the editorial on the preceding page, you now know all about the editors who will be bringing you *Atari Explorer* from now on. You also know that we want to create a magazine that will meet your needs. To do this, however, we need to know who you are and what you want the magazine to be.

We would appreciate it, therefore, if you would take five minutes to fill out this questionnaire and return it to us. All it will cost you is a few minutes and a 22¢ stamp. In return, we will be able to create the magazine that best meets your needs.

Obviously, the sooner we hear from you, the sooner we will be able to implement your suggestions, so please return the questionnaire (a photocopy is fine) to:

Reader Survey
Atari Explorer
7 Hilltop Road
Mendham, NJ 07945

I. EDITORIAL CONTENT

1. Please check your reaction to each of the following as a regular feature:

Reviews and evaluations of:	Great	Good	Fair	Forget It
New Computers from Atari	☐	☐	☐	☐
Printers	☐	☐	☐	☐
Plotters	☐	☐	☐	☐
Disk Drives	☐	☐	☐	☐
Music Systems	☐	☐	☐	☐
Other Peripherals	☐	☐	☐	☐
Business Software	☐	☐	☐	☐
Personal Productivity Software	☐	☐	☐	☐
Communications Software	☐	☐	☐	☐
Educational Software	☐	☐	☐	☐
Entertainment Software	☐	☐	☐	☐
Books	☐	☐	☐	☐
Departments:				
Letters to the Editor	☐	☐	☐	☐
Editorial	☐	☐	☐	☐
Inside Atari	☐	☐	☐	☐
Teletalk	☐	☐	☐	☐
Sound Chip	☐	☐	☐	☐
Graphics	☐	☐	☐	☐
People Profiles	☐	☐	☐	☐
User Friendly	☐	☐	☐	☐
Try This!	☐	☐	☐	☐
New Hardware Announcements	☐	☐	☐	☐
New Software Announcements	☐	☐	☐	☐
Product Previews	☐	☐	☐	☐
Technology Articles	☐	☐	☐	☐
Programming Tutorials	☐	☐	☐	☐
Ideas/Philosophy	☐	☐	☐	☐
Graphics Articles	☐	☐	☐	☐
Music Articles	☐	☐	☐	☐

2. What type of article would you like to see more of in *Atari Explorer?*

_____

_____

3. Are there any writers/programmers whose work you would especially like to see in *Atari Explorer*?

_____

_____

II. YOUR COMPUTER(S)

4.

Type	Mfr. & Model	Use at Work	Use at School	Use at Home
Mainframe	_____	☐	☐	☐
Minicomputer	_____	☐	☐	☐
Personal computer 1	_____	☐	☐	☐
Personal computer 2	_____	☐	☐	☐
Personal computer 3	_____	☐	☐	☐
Personal computer 4	_____	☐	☐	☐

5. About the Atari computer you use most frequently: What model is it? _____
Equipped with:
☐ Floppy disk drive(s) ☐ Dot matrix printer ☐ Hard disk ☐ Color monitor
☐ Daisy wheel printer ☐ Graphics tablet (or equiv.) ☐ Modem ☐ Monochrome monitor
About how much did the entire system cost? _____

6. About the Atari computer you use second most frequently: What model is it? _____
Equipped with:
☐ Floppy disk drive(s) ☐ Dot matrix printer ☐ Hard disk ☐ Color monitor
☐ Daisy wheel printer ☐ Graphics tablet (or equiv.) ☐ Modem ☐ Monochrome monitor

7. About the software you use on your Atari computer(s).

	Use Frequently	Use Occasionally	Sits on the shelf
Word processing pkg.	☐	☐	☐
Spreadsheet pkg.	☐	☐	☐
Database pkg.	☐	☐	☐
Communications pkg.	☐	☐	☐
Graphics pkg.	☐	☐	☐
Financial analysis	☐	☐	☐
Educational pkgs.	☐	☐	☐
Entertainment pkgs.	☐	☐	☐
Music synthesis	☐	☐	☐

What is the approximate value of software you have for your personal computer(s)? _____

8. Do you plan to upgrade your Atari system? ☐ Yes ☐ No
If so, how soon? ☐ Within the next 3 months ☐ Within the next 3–6 months ☐ Within the next year

9. Do you program on your Atari computer(s)? ☐ Yes ☐ No
If so, which languages do you use?
☐ Basic ☐ Pascal ☐ C ☐ Forth ☐ Machine language ☐ Logo ☐ Action
☐ Other _____

10. Do you type in programs from magazines? _____
If so, what is the longest program you would consider typing in?
☐ Fewer than 50 lines ☐ 100–200 lines ☐ More than 500 lines
☐ 50–100 lines ☐ 200–500 lines

11. Have you ever had difficulty getting a program from a magazine to run? ☐ Yes ☐ No

12. Do you subscribe to an information service?
If so, which one?
☐ Compuserve ☐ The Source ☐ Delphi ☐ Genie ☐ American People Link
☐ Dow Jones ☐ BRS ☐ Easylink/In Fact ☐ Other

III. MAGAZINES

13. Which of the following do you read regularly?
☐ Analog
☐ Antic
☐ STart
☐ STlog
☐ Compute
☐ Family Computing
☐ Personal Computing
☐ Byte
☐ Club Newsletter
☐ Wall Street Journal
☐ Science Magazine (Scientific American, Discover, Omni)
☐ Newsweekly magazine (Time, Newsweek, US News)
☐ Smithsonian
☐ National Geographic
☐ Other special interest magazine(s)

14. Please rank the following sources of information in order of importance for deciding upon purchases of computer hardware and software. (1 = most important, 7 = least)
☐ Experience of friends
☐ Salesman in store
☐ Review in magazine
☐ Advertising in magazine
☐ New product announcements
☐ Exhibit at show or convention
☐ Other _____

15. Have you ever purchased anything mail order?
☐ Yes ☐ No

16. Have you ever purchased a computer product as a result of having read about it in a magazine ad?
☐ Yes ☐ No

IV. YOU

17. Age _____ 18. Sex ☐ Male ☐ Female

19. Please write in your job function and the type of establishment for which you work. Follow the approach in the examples:

Job Function	Type of establishment
Financial manager	Automobile manufacturer
Dermatologist	3-man practice
Mathematician	Government agency
Writing	Free-lance at home
_____	_____

20. Where do you live (state, province, or country)?
_____

21. What are your present annual earnings?
_____

22. Comments: _____

BOOK I + DISK: (The Original) Thoroughly explains the techniques used by advanced software pirates, and the copy protection methods used to stop them. It offers clear and understandable explanations sophisticated enough for software writers of any scale yet easy enough for a beginner just wanting to learn more about Atari® computers. A MUST READ FOR ALL ATARI® OWNERS.

BOOK INCLUDES: • Duplicate sectoring • Custom disk formatting • Creating "BAD" sectors • Hardware data keys • Legal protection like copyrights, trade secrets, patents • Protecting BASIC programs • Self-modifying Code • ROM + EPROM cartridges • Hidden serial numbers • Self-destructing programs • Freeware • Misassigned sectoring • Much, much more.

DISK INCLUDES: • Directory mover • VTOC scanner • Duplicate sector finder • Sector mover • Bad sector writer • Sector data displayer • Autorun builder • Other useful programs.

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BOOK II + DISK II: Advanced Software Protection. This all new sequel starts where the highly acclaimed Book I leaves off. Book II is the most up-to-date resource available for the Atari® owner. Includes reviews and explanations of products such as: The Happy Enhancement,* The Impossible,* The Scanalyzer,* The Chip,* The Pill* and Super Pill* & many others.

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Computer Eyes lets you take any form of video input and saves it as a high-resolution graphics screen. You can use a video camera, VCR, TV output, video disk, other computers, etc. Now you can capture your picture, your friends or any video image and show it on an Atari computer. Computer Eyes is an innovative slow scan device that connects between any standard video source and your Atari computer (see the review in A.N.A.L.O.G. magazine).

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Adds up to MORE POWER, MORE versatility, and MORE features than any other print program. And best of all it gives you BETTER QUALITY PRINT-OUTS.

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Record and manipulate sounds in their pure digital form. Plug in the microphone (included) or hook it up to a radio, tape recorder, TV, etc. Comes with an audio output jack so you can play back through your stereo or PA system. Record, play, analyze, and manipulate pure digital sound using your ST's power and easy mouse control.

Comes complete with everything you need for only **$119.95**

Digitize Your Voice With Parrot . . . so good it is being used by professional musicians in a band.

PARROT

All new sound digitalizer and synthesizer for your Atari. Tired of low-quality mechanical sounding voice output? Now you can make any Atari speak in your own voice. Tired of four tone sound? Now any Atari can play a whole orchestra complete with a singing choir. "The Parrot" digital sound synthesizer system lets you do all this and much more.

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Mark Jansen answers the most-asked questions about the Atari 520ST and 1040ST.

Inside Atari

Providing customer support for computers as complex, versatile, and powerful as Atari's 520ST and 1040ST is demanding work. Atari's Customer Service representatives are trained to provide experienced professional users and committed hobbyists with highly technical information. Yet, at the same time, they must be prepared to offer easy-to-understand advice that can make the difference between helpless frustration and satisfied progress for the beginner.

We asked Mark Jansen of Atari Customer Service to tell us what questions new users and potential ST buyers most often ask. The questions he came up with, and his answers, follow. If you are just starting out in ST computing, read on—you are sure to pick up some useful information.

Q: Is the Atari 520ST or 1040ST IBM compatible?

A: No, at this time the Atari ST series is not IBM compatible. An MS-DOS emulator is, however, currently under development. This hardware device will give ST series computers the ability to run most IBM software.

Q: Can I hook up a third-party printer to the 520ST or 1040ST?

A: Atari recommends the Atari SMM804 parallel dot matrix printer for a variety of reasons. First, Atari supports the SMM804 fully—if you have a problem with it, we can duplicate the situation and provide a solution. Moreover, interfacing a printer to a computer and software so as to make the best use of the features of all three is a real challenge, even for an experienced user. Developers of ST software are obliged to support the SMM804, however, so interfacing and configuration are seldom a problem.

Most parallel printers that work with the IBM PC will work on the Atari ST (Epson, Okidata, and Star Micronics printers are good examples), provided the appropriate cable is available. In most cases, this must be purchased separately, so be sure to inquire about cabling when you purchase your printer. Ask for an "IBM-style DB-25 (male) to Centronics cable" if your dealer does not know what type to specify.

In most cases, a parallel printer is your best choice for general use. Serial printers can be hooked up via the ST RS-232 serial port. However, this is a less desirable method of attaching a printer, because some software assumes that the printer is connected to the parallel printer port.

Note also that some third-party parallel printers lack the sensitivity necessary to pick up the signals the ST sends. In such cases, the printer either refuses to work outright, or will work only intermittently. Unless you have decided on one of the popular brands named above, try before you buy.

If you already own a parallel printer and you can't get it to work with the ST, one solution is to try interfacing the printer via a printer buffer. This is a (usually fairly inexpensive) hardware add-on that goes between the computer and the printer, using an extra parallel cable. The ostensible purpose of the buffer is to capture data coming from the ST at high speed (freeing your computer quickly so you can get on with other tasks), then send this data to the printer at a somewhat lower speed. A side effect of this process is to strengthen the ST signals enough to allow your printer to pick them up. Note that this solution is not guaranteed to work with all printer buffers or with all printers, so once again, try before you buy!

Q: Can I connect a modem to an Atari ST?

A: Yes, provided that the modem connects properly to the industry standard RS-232 port on the back of the ST. Atari will soon release a versatile and inexpensive modem for the ST. In the meantime, most modems that connect to the RS-232 port seem to work.

To use your modem, you will need telecommunications software. If you just need to "talk" to another computer, and do not need to be able to transfer files, the built-in VT-52 terminal emulator (loaded as a desk accessory from the language disk that comes with the ST) will work just fine. If you do need to transfer files, you can choose one of several commercial packages that provide this capability, along with other features (see our review of one such program, *Flash*, in this issue).

Q: My 520ST didn't come with TOS in ROM. Now that the TOS ROMs are available, what is the advantage to having them installed?

A: The TOS ROMs reflect Atari's most recent (now standard) revision of the ST operating system. Some, if not most, future software will assume, or even require, TOS in ROM. Aside from that, there are two important reasons for having the TOS ROMs installed. One reason is memory—having TOS in ROM frees up about 190K of RAM for applications software and desk accessories. The second reason is startup speed. All other things being equal, it takes quite a bit longer to boot your ST with TOS on disk than it does when TOS is already resident in ROM.

Q: If I start up my 1040ST (or 520ST with TOS ROMs installed) using anything other than my language disk, I don't get a Control Panel or a VT-52 Emulator in my Desk menu. What's wrong and how do I fix it?

A: Features like the VT-52 Emulator and Control Panel are called "desk accessories." They are programs stored on disk and automatically loaded into the ST on startup—not built-in features of the computer. If you look at the directory of your language disk, you will see the Emulator and Control Panel programs stored as EMULATOR.ACC and CONTROL.ACC. Note the filename extender, .ACC, identifying these as desk accessories.

When you start up your ST, it looks for desk accessories on whatever disk you place in drive A:, and installs them automatically, if found. Naturally, if the disk with which you boot doesn't have accessories on it, the ST can't install them. If you want your desk accessories to be installed on power-up, you should copy them from your language disk to the disk from which you plan to boot.

Because desk accessories are programs, they use part of the ST RAM memory when they are resident. In certain situations (for example, when using ST Basic with large program files), you may wish to prevent installation of desk accessories by removing them from your boot disk. Do not, however, under any circumstances, remove these files from the disks that came with your computer. These are your valuable original diskettes and should never be modified. Experiment using copies only!

Q: I have two disk drives. Whenever I access drive A: (to load a file, for example), drive B: turns as well. Is there anything wrong here?

A: No, this is a normal occurrence.

Q: When I have a directory window open on a disk, how do I recatalog the disk without closing the window and opening it up again (when I change disks, for example)?

A: Press the Esc key. ■

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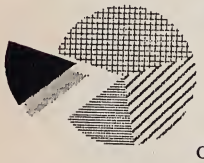

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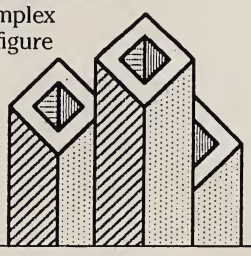

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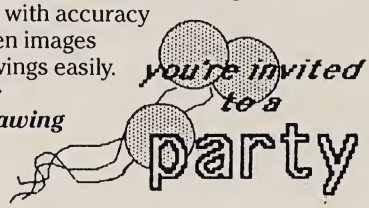

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The world's fastest semiconductor, cellular array processing, and OPT EPROMs

What's New in Technology?

By DAVID H. AHL

Scientists from AT&T Bell Laboratories and Cornell University have built the fastest semiconductor device ever demonstrated, a switch capable of turning an electric signal on and off in 5.8 picoseconds (5.8 trillionths of a second). The previous switching record for such devices was 8.5 picoseconds.

In the time it takes the new device to open or close, light—traveling at 186,282 miles per second—would travel only one-sixteenth of an inch (1.6 mm). This speed rivals—and beats—a competing technology, the superconducting Josephson junction, which requires a supercooled environment of liquid helium (4.2 degrees Kelvin, or −268.8 degrees Centigrade) to operate. The new device achieved the 5.8 picosecond record at the temperature of liquid nitrogen (77 degrees K, or −196 degrees C). At room temperature (300 degrees K, or 27 degrees C), the switch operates at 10.2 picoseconds.

Circuit components in the new switch are as small as one-third of a micron. By combining submicron technology and exceptionally high quality control of materials, scientists have shown that features of that size can be integrated with larger elements to create ultra-high-speed circuits. Moreover, the submicron gate technology has very low power requirements, making it suitable for use in on-board satellite communications equipment, as well as computer microprocessors and memories.

Edward Wolf, director of the submicron facility at Cornell recently told a press gathering that "this is a significant step in the evolutionary process to provide higher bandwidths and higher frequencies for advanced microelectronics." He added, "At Cornell, we're beginning to use the term 'nanoelectronics,' which we anticipate will be more descriptive of advanced microelectronics by the end of the century."

Cellular Array Processing Power

A cellular array processor (CAP) under development at the ITT Advanced Technology Center has the potential to provide a desktop computer with the processing power of a large mainframe and to replace a mainframe with one a hundred times as powerful.

Compared to a conventional processor which performs operations sequentially (multiplication, for example, is a series of additions), a CAP does many operations simultaneously and in parallel. One of the main CAP parts is a VLSI (very large scale integration) array chip which contains one-bit processors; each one-bit processor has its own set of 32 general-purpose registers and its own memory from 16K to 64K bits. These processors can be duplicated as many times as will fit on a chip. Currently a chip with 16 processors has been fabricated, but the number is expected to rise as VLSI design and manufacturing techniques continue to improve. The CAP chips themselves can be wired together to form processing arrays of virtually any power and speed.

Flexibility results from the way the processors are programmed. For example, a 16 by 16 array of one-bit processors could do 32 simultaneous 8-bit additions or a single 256-bit addition.

Along with simplicity, flexibility, and speed, the CAP design boasts high fault tolerance. The technique is relatively inexpensive and should result in cost-effective systems with high processing capability and excellent reliability.

Because it can perform many simultaneous operations, the CAP is particularly suited to solving problems that involve large quantities of similar data, such as speech recognition, robotics, and office automation.

Short Bits

The Intel 80386 microprocessor chip can address up to four gigabytes of main memory and 64 trillion bytes of virtual memory, and process data 32 bits at a time . . . The Honeywell Physical Sciences Center has announced a high speed optical interconnect consisting of a gallium arsenide laser diode with its associated drive circuit and an optical detector and amplifier on a single chip, coupled to an optical fiber. The interconnect, with transmission rates in the gigabit range, is ideal for short communication links between silicon chips, circuit boards, and processors in a distributed network . . . *Electronic News* recently carried a story about OTP EpROMs; in case you didn't know, those are one time programmable erasable programmable read only memory chips (howzzat again?).

Quote of the month: "Trying out software on typical computer users really gets you back in touch with how complex it all is."—William Gates, Chairman, Microsoft Corp. ■

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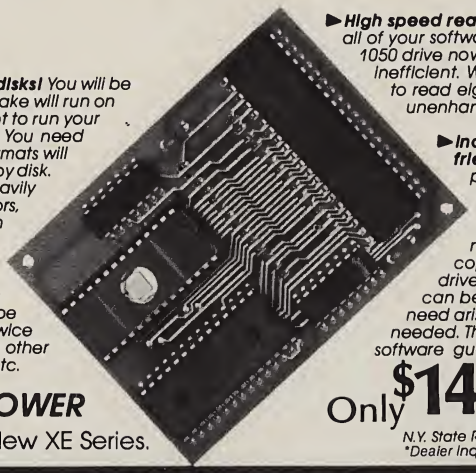
The only Copy system You will ever need.

What will it do?

▶***The main purpose of the Duplicator is to copy disks!*** *You will be able to copy just about any disk! The copies you make will run on any Atari drive. The Duplicator need not be present to run your backup copies. The Duplicator is fully automatic. You need only insert source and destination disks. Custom formats will be read and in turn reproduced on the backup copy disk. Our device will reproduce any custom format or heavily copy guarded scheme, bad sectors, double sectors, 19 through 24 sector format will present no problem to the Duplicator.*

▶***You will still have single density, density and one half, and double density.*** *When you have a Duplicator installed in a 1050 drive that drive will be turned into true double density. You will have twice the disk storage. Your drive will be compatible with other double density drives as The Rana Indus. Percom, etc.*



▶***High speed read & write.*** *Your disk drive will read and load all of your software, saving wear and tear on your drive. The 1050 drive now reads one sector at a time. This is slow and inefficient. With the duplicator installed you will be able to read eighteen sectors in the time it takes standard, unenhanced drives to read one.*

▶***Included with every Duplicator will be user friendly disk software.*** *A simple, menu driven program will allow you to copy all of your software. A Duplicator enhanced drive will be a SMART drive. We plan to write many new and exciting programs that can only be run on an enhanced drive, eg. sending a copy-guarded disk over the phone. Since the drive is now fully programmable, future upgrades can be made available to you on disks, should the need arise. No further hardware changes will ever be needed. The Duplicator comes with a full hardware and software guarantee.*

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18 Utility Programs on disk. Each program is specifically designed to aid you in backing-up your software collection. You will be able to duplicate **disks, cartridges** and **cassettes.** Any one program is worth the price of all 18. It has taken us over one year to put together this fine collection on the **Hacker's Treasure Chest** disk. Some of the programs you will receive are: **Cartridge Copy, Bootape Maker, Tape to Disk, SectorCopy, The Unprotector, Sector Disassembler, Bad Sector Finder, Modem Program...** plus more. All of these programs plus 10 more on this disk. You will also receive a **menu** that will run basic and binary files just by typing the number of the program. Any file on any disk will load automatically from this menu. ALL FOR ONLY **$34.95**

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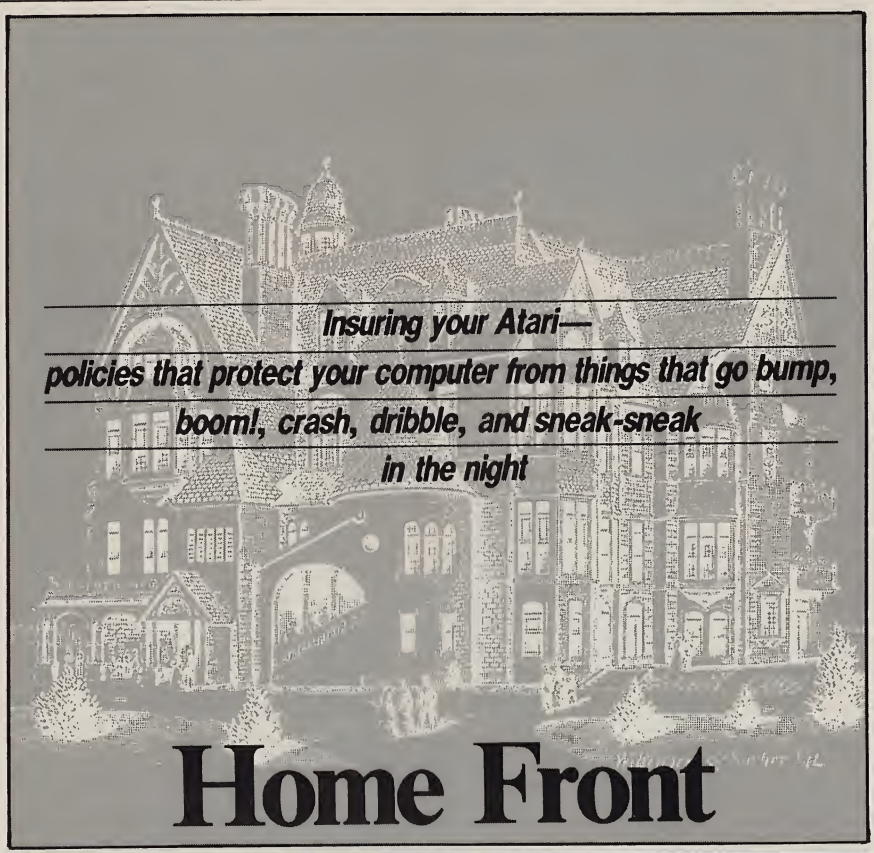

Insuring your Atari—
policies that protect your computer from things that go bump, boom!, crash, dribble, and sneak-sneak in the night

Home Front

By ROXANE FARMANFARMAIAN

Few things more quickly make me feel like taking a snooze, or suddenly wanting to straighten out my disk files (a chore I've put off for the last six months) than the mention of insurance. On the other hand, I have learned the hard way that every once in a while, things happen to even the most conscientious, careful, and tidy people. Yes, even to people who own Ataris, and yes, even, occasionally, to their Ataris. So, unless you are the type who enjoys kicking yourself with remorse when it is too late, prop up those eyelids and take a quick, hard look at insurance that protects your computer investment.

As you are scouting around, investigating different policies, you will no doubt soon discover, as I did, that insurance is one of those man-made morasses of inconsistency and confusion, the brass tacks of which are better left to the pros. For example—"Acts of War." If armed incursions are your great fear, you might as well pack it in. No policy covers damage to your computer caused by bombing. On the other hand, some do cover damage from riots and insurrections (aren't they kind of mini-wars?)

Another example: should stray satellites or other flying objects fall through your roof, with the right insurer (in this case, Nationwide), your Atari is covered. But if your policy is carried by anyone else, tough luck. The one hazard on which all insurance companies seem to agree is nuclear accident—nobody wants to send an agent out to a radioactive house. So, if you live near a reactor and your Atari starts gently glowing, replacement is your problem.

Radiation and insurrections aside, the problems most Atari owners should anticipate—and insure against—are theft, loss, or damage of computer (and peripheral) hardware, software, and data. Protecting against these hazards is a two-step process.

The first step is to find a basic policy that offers good, general protection or discover whether an existing homeowner's or property insurance policy covers, or can be amended to cover, your computer system. Step two is complying with the regulations in the policy, keeping records of your equipment and software purchases (to substantiate claims), and making sure you maintain enough coverage.

Insurance is not the same as the repair service that Atari Corp. provides for its hardware or the service contracts you may have for third-party components of your system. Insurance policies will ease the pain in your heart when you come home one day and find your computer has disappeared, or your dog has taken a sudden fancy to your disks and buried a few choice ones (puncture wounds and all) under a bush.

The Atari "as needed" repair service, on the other hand, is a centralized program that guarantees repair or replacement on any piece of Atari equipment that has failed. The deal is, you return the equipment (a 130XE, for example), plus a very reasonable fee (in this case, $75), and Atari will repair it or send you an equivalent machine. In somewhat similar fashon, a service contract covers repairs on third-party equipment.

How to Obtain Coverage

But getting back to insurance, your first task is to see if an existing homeowner's or renter's policy will cover your Atari (most do). Then, depending on the company you use, either your computer will be automatically covered as part of your policy or you will be asked to pay a small fee for what is called an "endorsement"—a supplement to your policy that specifically covers your Atari.

Nationwide, for example, includes coverage for up to $3000 worth of computer equipment, right in its standard homeowner's policy. That should be enough, unless you're an even bigger Atariphile than I am, in which case, you can pay $8 for each additional $2000 of coverage, up to a limit of $10,000. Nationwide will protect your Atari(s) against power surges, protect your investment in commercial software, and even cover software you write yourself if you use it for a business that you operate from your home.

Fireman's Fund protects computer equipment from smoke and fire damage in its standard policy—as long as the computer is located in the home and used only for personal tasks. For an extra $2 per $100 of coverage, Nationwide will insure your Atari against vandalism and theft up to a limit of $2000.

If you use your Atari for business or often tote it from place to place, you can buy from Fireman's Fund an "all-risk" supplement, which insures the computer against earthquakes, floods, and power surges, regardless of location or use. This extended coverage costs $1 per $100 of coverage and has no limit. Data re-creation insurance costs $2 per $100 of coverage and covers all lost data, whether business or personal.

Allstate, on the other hand, will tack onto its standard policy a computer supplement, which will run you $1 for every $100 of coverage (unless your house is worth $100,000 or more, in which case you get $5000 of coverage free). All-

Should stray ***satellites or other flying objects fall through your roof, with the right insurer, your Atari is covered.***

state will not cover damage from power surges or earthquakes or even flooding, but it will insure all your data and homebrew software for an extra $2 per $100 of coverage.

The Software Problem

Insurance companies vary widely in their coverage of software. Most include commercial software, but few accord the same honor to user-developed programs or data stored on magnetic media. The reason is that it is difficult to put a dollar value on home-hewn software. If you can prove you use the programs you have written for business purposes, however, there are a number of insurance companies that will take you on.

Mention what software you use on contracts or invoices and keep printouts in your business files to corroborate your story. Better yet, take a couple of Polaroids of critical screens and send them off to your insurance agent to put in his or her files.

Generally, you can expect a homeowner's policy (or the supplement you add to it) to take care of the basics: theft, fire, water damage, vandalism, and other acts of nature like trees falling through your roof. The rub comes when you realize that your policy doesn't include certain provisions you deem particularly important. Protection against earthquakes and volcanic eruptions (for example), and coverage of software and personal data are areas in which standard policies often waffle. Also, there is the question of what to do if you don't have a homeowner's policy or other property insurance.

In such cases, there is only one real option: buying a policy just for your computer system. Unfortunately, not many companies offer computer-specific insurance.

One that has been around for a while is Safeware, which for $39 offers $2000 worth of protection against power surges and all other disasters and hazards (save nuclear), and even insures your data (irreplaceable though it may be). An added advantage is that Safeware covers your system while in transit—during a move, for example (though theft from an unattended vehicle is excluded), or when you are carrying your Atari to a user group meeting or workshop. Commerical software is also covered, but not programs that you develop.

Whatever policy you sign your name to, be sure that you understand its provisions and be prepared to substantiate claims with proof. Keep all receipts for computer equipment safely tucked away (preferably someplace fireproof) along with photographs and other documentation proving that the stuff is really yours.

Money in The Mail

One of the things to be aware of when dealing with insurance is exactly what type of reimbursement you can expect. In the past, many policies paid the equivalent of the purchase price; today, most, if not all, pay the cash value of the system—replacement cost less depreciation. Depending on how old your system is, this could turn out to be a mere pittance. For an extra 5 to 15% of your premium, however, most insurance companies will guarantee to reimburse you for the full replacement value of your system, which means that you should be able to buy an equivalent new system with the money you receive when your claim is settled—depreciation is not taken into account.

Insurance people usually defer to the judgment of local dealers in deciding which machine currently on the market is more or less equivalent to the one you are replacing. This is a real blessing, as most insurance companies are not well-versed in the fine points of computer science. It would be worth your while, therefore, to get to know your local dealer (even if you bought your system from someone else), so that he can corroborate your claim and make a fair recommendation to your insurance company, should the need ever arise.

Not to worry too much, though, because Atari prices continue to drop. There is thus a good chance that you will be able to buy even more power for the price when your insurance check comes in. ■

Roxane Farmanfarmaian is Technology Editor of Working Woman magazine.

For More Information

Allstate
Allstate Plaza
Northbrook, IL 60062
(312) 291-5000

Fireman's Fund
777 San Marin Dr.
Novato, CA 94998
(415) 899-2000

Nationwide
1 Nationwide Plaza
Columbus, OH 43216
(614) 249-7111

Safeware
P.O. Box 02211
Columbus, OH 43202
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800/XL/XE, any drive(s) or hard drive, any printer. Speed with ram upgrades comparable to 16/32 bit system. Too many individual features to list. Full sorting. Printed/blank forms. Standard and business utilities, loan/interest schedules, etc. Optional payroll available.

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Puzzles & Problems

Some of the following problems can be solved in your head, some require pencil and paper, and still others require that you write a computer program. Answers are on page 57.

No Change

What is the largest sum of money in current U.S. coins (no silver dollars, please) that you could have in your pocket without being able to make change for a dollar, half dollar, quarter, dime, or nickel?

Divisible By 14

Find the sum of all the numbers between 100 and 1000 that are evenly divisible by 14.

Likes and Dislikes

My grandmother likes coffee but hates tea.

She likes apples but dislikes bananas.

She likes beets but does not like turnips.

She likes cookies but dislikes fudge.

She adores cool things but hates hot things.

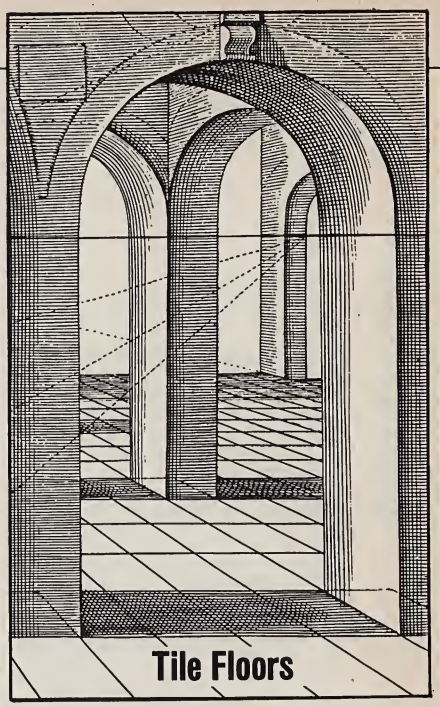
Which of the following things do you think she will like: oranges, figs, rolls, bread, biscuits, cattle, pigs, worms, rubber, plastic, copper?

What Number?

A mystery number has two digits. The number minus the sum of its digits equals 36. The sum of the digits plus the product of the digits equals the number minus 8. What is the number?

Fly and Mosquito

A fly and a mosquito start together flying around a building, but the fly circles the building in six minutes, the mosquito in four. How many minutes will elapse before the mosquito passes the fly?



Tile Floors

Two square rooms in a house were tiled with 2120 tiles, each one foot square. Each side of one room is 12 feet longer than each side of the other. What are the sizes of the two rooms?

Zilch

If 1 zilch is equal to 13 milches, and 1 milch is equal to 23 pilches, would you accept 8000 pilches for 26 zilches?

Sum Cubes

The sum of three positive integers is 43. The sum of the cubes of the numbers is 17299. What are the integers?

Jack's Beanstalk

Jack noticed an interesting growth pattern in a beanstalk he planted. On the first day, it increased its height by $\frac{1}{2}$. On the second day, it increased by $\frac{1}{3}$, on the third day, by $\frac{1}{4}$, and so on. How many days would it take to reach 100 times its original height?

Stop Taking Vitamins

If you think the vitamins you are now taking are doing you any good, wait until you hear the latest news on why they may not.

Stop taking that innocent looking vitamin pill until you read this report.

By Joseph Sugarman

This may come as a shock. But according to the latest research, those vitamins that you take every day may be doing you absolutely no good. For example.

FACT: Vitamins should be taken after a meal—never before. The body must first have protein, fats, or carbohydrates in the digestive tract to properly break down the vitamins for proper absorption.

FACT: Your body has a need for a natural vitamin balance. Too much of one vitamin may cause another vitamin to be less effective. For example, vitamin A should be taken with Vitamin E but excessive iron should not.

FACT: If you take too much calcium, you may deplete the magnesium in your system. And you need magnesium to convert food into energy.

FACT: Some vitamins are best taken in the morning and others at night. For example, the trace element chromium helps break down the sugar in your food which in turn creates energy—perfect to start the day. But at night you should take Calcium which has a relaxing effect—perfect for the evening.

FACT: Athletes or people who exercise a great deal need vitamins more than people who don't exercise. Vitamins are depleted at a much faster rate during exercise than during any other period of time.

But there was a series of other facts that surprised me too. For example, despite everything I've just mentioned on the care in taking vitamins, there are those people who absolutely need vitamins because of the mental or physical activity that they undergo. People on a diet, under stress, those who smoke, women who take contraceptives and even those who take medication—all rob their bodies of some of the essential vitamins and minerals that they need to help combat the various habits or conditions they are under.

And with proper vitamins in the proper balance and at the proper times, you will have more energy and vitality. Little changes may take place. Your nails may become stronger, your hair may become thicker and your skin may be more elastic which will keep you younger-looking longer.

DOCTORS HAD IDEA

About two years ago a group of doctors had an idea. They realized that many people were taking vitamins and not really noticing any difference in their health. They also realized that, based on the latest nutritional findings, the vitamins people were taking may not have been doing them any good. So they formed a group of advisors consisting of nutritionists, dieticians, dermatologists, biochemists and physicians, and they worked on the development of a vitamin program that incorporated all of the latest information on vitamins, minerals, nutrition, food processing—even stress research. They realized that vitamins were a two-edged sword. They could either help you or hurt you.

They then took all this information and developed the most effective combination of vitamins and minerals, formulated four tablets—one for the morning and one for the evening—and one for men and one for women and then started a test program that lasted over two years. The results speak for themselves.

It was perfect for weight loss programs and it was perfect for people under stress. It helped many increase their energy levels. Smokers benefited. Some under medication benefited. And before long the company that had developed the program became the fastest growing vitamin company in the United States. And no wonder.

SEVERAL BENEFITS

With the proper vitamin and mineral balance, taken in the right quantity in the right combination and at the right time, several obvious benefits occur. First, you may develop a better mental outlook because you've got the energy and the zest to accomplish more. As a result of the trace elements copper, zinc and manganese, your body is helped to make its natural anti-aging enzymes that keep you fit. Improvements in your vitality translate into everything from better job performance to a more fulfilling sex life.

JS&A has been selected by the vitamin company to introduce their medically formulated vitamin program. Every two months we send you a two month's supply of 120 fitness tablets—one to be taken after breakfast and one after dinner.

During the first two months, you will have ample opportunity to notice the difference in your energy level, your mental attitude and your overall stamina. You should notice little things too, like the strength of your fingernails, your thicker hair. Your complexion may even take on a glow. Some of you may notice all of these changes and others may notice just a few. But you should notice a change.

If for any reason, you do not notice a change, no problem. Just pick up your phone, and tell us not to send you any more vitamins. And if you ask for a refund, you won't even have to send the empty bottle back. It's yours free for just giving us the opportunity to introduce our vitamins. However, if you indeed do notice a difference (which we are confident you will), you'll automatically receive a two-month's supply every eight weeks.

ONE MORE INCENTIVE

I'm also going to give you one more incentive just to let me prove to you how powerful this program really is. I will send you a bonus gift of a fitness bag with your first order. This beautiful bag will hold all your fitness gear and it's great too for short vacation trips. It's a $20 value but it's yours free for just trying the vitamins. Even if you decide not to continue, you keep the fitness bag. I am so convinced that you will feel and see a difference when you take these vitamins that I am willing to gamble on it with this unusual offer.

Vitamins indeed are important. And with today's research and new nutrition technology, you have a greater chance to achieve the fitness and health levels that may have eluded you with the typical store vitamins or the poor advice we may get in health food stores or from friends. Here is a safe, risk-free way to get one of the best vitamin programs in the country, formulated by a physician, with the right combination of vitamins, minerals and trace elements, in a convenient program that assures you of delivery every two months. I personally take and highly recommend them. Order your trial quantity, today.

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To The Future

In which we are introduced to Atari Corp.

and given a glimpse of what lies ahead

By BETSY STAPLES and JOHN JAINSCHIGG

"We're merchants," said Neil Harris, Atari's director of marketing communications, characterizing Atari Corp. for us, two of Atari's newest employees.

"When people think of IBM, they think of service and security. They envision well-mannered sales and service people coming to their doors in dark suits, white shirts, and conservative ties. When they think of Apple, they think of the California counterculture. They see laid-back hackers in bluejeans and t-shirts slouched over their computers in the middle of the night.

"We at Atari represent a third force in the marketplace. We're merchants, always wheeling and dealing with suppliers to get the best possible deals so we can make a fair profit and pass the savings on to our customers. Jack Tramiel's goal has always been to give the consumer the best possible product at the lowest possible price."

With that goal in mind, the glitzy behemoth that was "Old Atari" has been streamlined. Fancy offices, extravagant press parties, and excess personnel have gone the way of 16K memories and membrane keyboards. The new Atari looks like what it is: a family business—a growing, entreprenеurial concern whose managers monitor the disposition of every dime as if it were their own.

One of those managers told us, only half in jest, that if an Atari employee is not doing at least five different jobs, his superiors start looking around for more work to give him. The detailed job descriptions and rigid departmentalization of corporate America have no place at the new Atari.

The result has been an organization of great flexibility—a very flat hierarchy informed at every level by a strong, proprietary conscience. "Everyone has, at one time or another, done parts of everybody else's job," one employee explained. "So people criticize and share their expertise very freely. They get involved in each others projects and enthusiasms; they volunteer for things; they help out; they make do."

Neil Harris is a case in point. Our almost full-time host during a three-day "get acquainted" tour, Neil acts as Explorer's "man behind the scenes." He also coordinates contact with the national press, doing everything from arranging for review equipment and price lists to helping eager technical editors find critical PEEK and POKE locations. He writes Atari's dealer newsletter, coordinates with the advertising agency, manages an ambitious program in dealer education that has him traveling one week out of every month, and reinforces Atari's presence at trade shows and user group fairs.

He also, incidentally, is sysop of Atari's five-line electronic bulletin board, AtariBase, and spends a good deal of personal time helping users and third-party developers on three national networks. Almost incidentally, he also beta-tests Atari software and hardware. A former programmer and long-time technical writer, Neil has an encyclopedic knowledge of Atari's products and history, and a fervent belief in the future of its technology.

Technology—read "product"—is a key emphasis throughout the company. While most of the competition rely on marketing and hope to sell their computers, Atari depends, in large part, on the computers to sell themselves. Offering a state-of-the-art product at low cost is a strategy that seems to be serving both the company and the consumer well.

An important part of this strategy is in keeping the lines of information open. The press, dealers, and third-party developers all have people to whom they can turn for answers in the new Atari. Users also have a source of information; a revamped Customer Service department, under Diana Goralczyk, is there to answer questions, provide technical advice and information, and soothe the occasional dissatisfied customer with a personal touch.

Indeed, organized user groups play a vital role in Atari's grassroots marketing scheme, forming an army of knowledgeable, energetic, and fervent partisans, helping to take Atari's message to the consumer. AUGs and ACEs began forming shortly after the first 400s and 800s rolled off the production line, as new users, eager to learn about their machines, banded together to share whatever information was available. Today, the corporation calls on them for local support and sage advice.

"The response of users groups has been just phenomenal." Says Sandi Austin, user group coordinator. "They volunteer to organize and help out at the shows, provide early feedback on new products, help educate new users, and distribute information. They're one of the most important resources Atari has."

Future of the 8-Bit Line

"What about the 8-bit users?" we asked John Skruch, product line manager for 8-bit systems. Rumors about

Photography by Jeff MacWright.

the fate of the old faithful series that began with the Atari 400 abound; how does Atari view the line and what is its future?

Skruch didn't hesitate for a moment: "There is a very viable, very loyal 8-bit market out there, and we plan to support it," came the answer.

He went on to explain that he sees the 8-bit market falling into three distinct segments. The first is represented by a person who has an elderly but adequate 800 and decides to upgrade to an ST. The old machine is still perfectly good, so it gets turned over, software and all, to the kids, who continue to want new programs and peripherals for it.

The people who comprise the second segment of the market are also 800 owners. The average owner in this group remembers the investment he has in the system and remains satisfied with its capabilities—it does everything he wants it to do. He, too, expects continued support.

The third group consists primarily of relative newcomers to the world of Atari, most of whom own 130XEs. Computers are still something of a novelty for them, and a reliable 8-bit system more than fulfills their requirements. The entire universe of Atari 8-bit hardware and software is uncharted territory awaiting exploration.

Keeping these three groups of users satisfied requires major corporate commitment—particularly in a period when many third-party manufacturers, lured by profits to be made in 16-bit software and peripherals, are lessening their support of 8-bit lines. The commitment is revealed in Atari's enthusiastic sponsorship and active development of new software and hardware products designed to take the 8-bit computers full-steam-ahead into new territories of entertainment, education, and productivity.

"We're putting in the missing pieces," says Skruch. "But we want to do it the right way—so that nobody is left out. That's why we took so long to bring out the new 80-column card.

"We knew that it would be easy to take signals out the backplane or the 800 slots—a few third-party cards did that—but we figured that if we were going to come out with an 'official' 80-column card—one that software manufacturers would support—it would have

Neil Harris

to be something that could be interfaced to all existing Atari 8-bit computers." The result is the XEP-80, an 80-column device that plugs into the joystick port of any 8-bit system, and actually *adds* video memory to the machine. Several software developers, Batteries Included and Synapse, among them, are in the process of adapting existing product to the device.

Other important components of a complete XE system are the compact XM301 autodial modem, which sells for only about $50, and the XMM801 dot matrix printer, which supports medium-resolution Epson graphics and requires no special interface. Skruch expects both of these products to be very popular with users who are looking for an easy, inexpensive way to get into word processing and/or telecommunications.

Echoing these hopes is Jose Valdes, engineer of both the 130XE and the XM301. "Compared to the old days, it's just so much easier to design efficient, cost-effective circuits," he said. "Compared to the old 800, the 130XE—a more powerful machine—is so much simpler. We know a lot more than we used to about how to put these machines together for low cost. The XM301 is a good example—it's essentially a single-chip modem. One chip provides all those capabilities."

On the horizon, Skruch sees a 1200 baud, Hayes-compatible modem and a 3.5″ disk drive for 8-bit machines. The drive, he speculates, will have approximately three times the storage capacity of the 5.25″ 1050 drive (which it will be able to emulate) and about twice the speed. The appearance of a 3.5″ drive will, in turn, he thinks, set the stage for the development of a one-meg floppy drive or a hard drive for the 8-bit machines. "The key is peripherals," he told us. "They are the important pieces that keep the line moving forward."

***The goal** in product development should be to increase performance by 20% each year. You can do this by either increasing performance or decreasing price.*

Focus on Solutions

Skruch and other Atari executives also contemplate opening up new territory in the 8-bit marketplace. In discussing their current plans, the idea of "computers as solutions" is consistently emphasized. Bundling a 130XE with a disk drive, modem, printer, and software, for example, presents the prospective purchaser with a solution. "We can say to him, 'Here is a complete word processing, telecommunications, or home record-keeping system that will do everything you want to do at a price you can afford. Once you decide to buy the Atari, you don't have to make any other decisions, and you know exactly how much it will cost.

" 'And you won't have to hire a consultant to install it for you. Because all the parts are made to work together, you can have your new computer up and running—doing useful work—within an hour of bringing it home from the store.'

"In marketing the 8-bit line, we focus on solutions," Skruch reiterated. "In fact, we offer our customers a choice of solutions. We don't say 'My dog is bigger than your dog—my computer is bigger, faster, prettier than your computer.' We say 'You have a need, and we can fill it.' "

Concluding his enthusiastic discourse on the future of the 8-bit Atari, Skruch posed the ultimate question to himself: "Is the 8-bit machine still a viable solution?" and answered it with a resounding "Absolutely!"

Research and Development

Upstairs in an airy corner office we found Shiraz Shivji, vice president for research and development, working at a desk piled high with mail, magazines, books, software, and other assorted literature. In the corners of the room were dead and dying plants—among the few vestiges of Old Atarian opulence that survive (or try to) throughout the building.

Shivji picked up the 8-bit theme right

Top shelf books from Abacus

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Gives you an in-depth look at this sensational new computer. Discusses the architecture of the ST, working with GEM, the mouse, operating system, all the various interfaces, the 68000 chip and its instructions, LOGO. 200pp $16.95

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Essential guide to the inside information of the ST. Detailed descriptions of sound and graphics chips, internal hardware, I/O ports, using GEM. Commented BIOS listing. An indispensible reference for your ST library. 450pp $19.95

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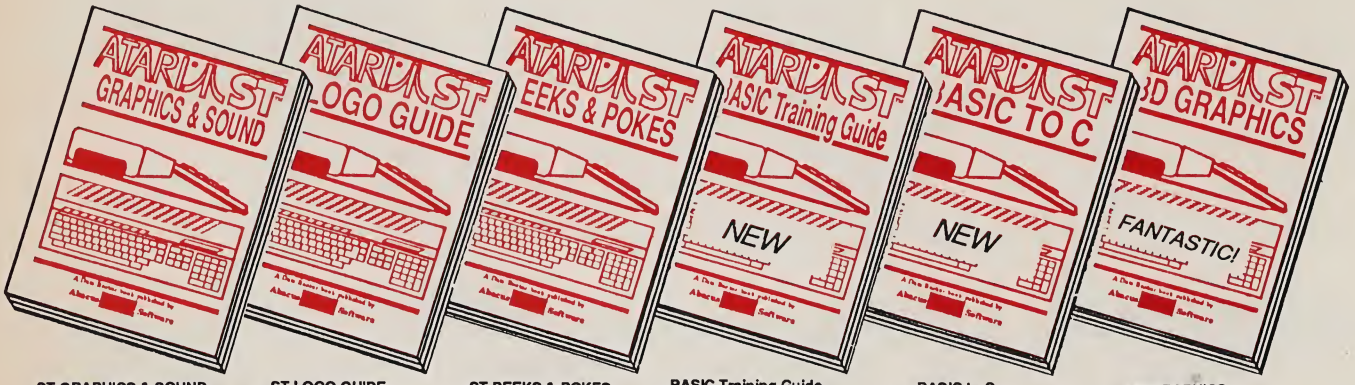

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Diana Goralczyk

away, using it as a springboard for a discussion of trends in the computer industry in general and Atari in particular. Looking back to the post-Altair, pre-IBM era, Shivji recalled the exultation with which the early, 8-bit microcomputers were greeted: " 'Gee whiz,' we said, 'at last we can do these amazing things that previously only large businesses and institutions could do.' "

"But over the past decade, the packing density of computer chips has quadrupled about every four years, creating a new generation of RAM roughly every 48 months. In 1977 everyone was working with 16K chips; then, in 1981, 64K chips became commonplace; and in 1985 we saw the availability of 256K chips in volume. Now, we are looking for the first commercial quantities of 1-Megabit chips to hit the market in 1987, so the cycle is becoming even shorter."

As technology has changed, Shivji explained, the computer design profession has had to adapt rapidly. "When the 8-bit systems were designed, the burden of the design effort rested on the custom-parts people. Many things had to be handcrafted, because no one had ever conceived of them before. Now, of course, there is far less emphasis on handcrafting—powerful off-the-shelf components and sophisticated development systems for custom silicon are readily available.

"Instead, the emphasis is now on overall architecture, particularly on bus design, which becomes increasingly important when you want an architecture that will support successive generations of chips."

Continuing Compatibility

"Atari has always been committed to continuing compatibility for its computer systems," Shivji adds, "and we remain committed to it in the 16-bit line. The way we have designed it, the 16-bit architecture can carry over from one generation of machines to another. We believe in standards; our aim in future generations is compatibility *down to the register level* and equivalent transparency in operating system environments.

"The whole idea of how to design a system has changed. Now, it is much more like programming. In fact, I recommend that designers read and learn about structured programming; *The Concept of a Subroutine*, by Maurice Wilkes of Cambridge University, is important reading for Atari designers.

"Right now, we are doing *structured architecture*, which has a great deal in common with structured programming. We have access to a full battery of layout tools, which vastly simplify the design process and improve the results.

"Simplicity is the key," he told us, remembering the development of the ST. "The architecture of that machine is so clean that it becomes very easy to add to and improve it."

Shivji recalls that when the ST series was under development it was codenamed RBP for Rock Bottom Pricing—"Atari wanted a state-of-the-art computer at a rock bottom price."

One of the things that enabled designers to create just such a product was a drop in the price of 256K DRAM (Dynamic RAM), which allowed them to build a faster machine with a larger memory capacity at a much lower price than would have been possible only months before. "We set out to build a 128K machine, but even as the operating system grew to its present 192K ROM/128K RAM, the price of the machine approached original estimates," said Shivji.

In discussing pricing, Shivji quoted Gordon Bell, former vice president of engineering for Digital Equipment Corporation: "The goal in product development should be to increase performance by 20% each year. You can do this by either increasing performance or decreasing price."

"It's not that we wanted to make the ST anything but state-of-the-art, and we really did do some revolutionary things. The video, for example—everybody said that 32 MHz video was much, much too fast for the chips to handle, and we proved them wrong. However, if I look back on what really drove the ST design effort, I would have to say that it was price-performance—the engine that drives every aspect of product development here."

Another thing Atari management wanted—and got—from the designers of the ST was fast work; design work for the ST was started in July and finished (including custom ICs) in December of 1984.

Speaking again, in general, Shivji noted that "Any design project a company undertakes must be do-able, and time is crucial to the success of any such project; the drive to challenge and incorporate new technology into a product can become all-consuming in the research lab. Technology for its own sake supplants product design as the

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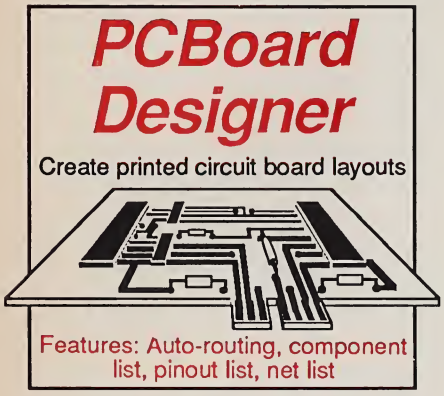

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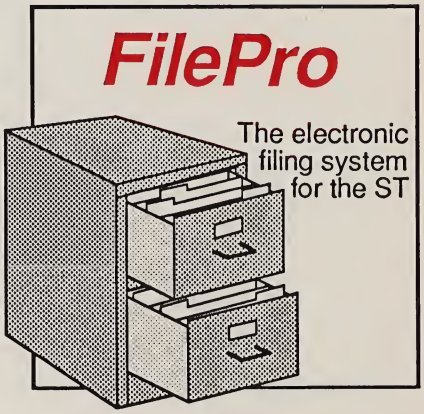

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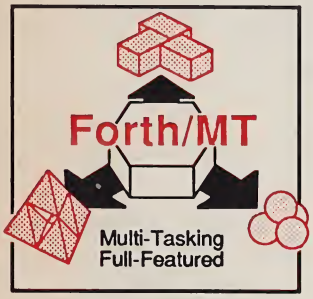

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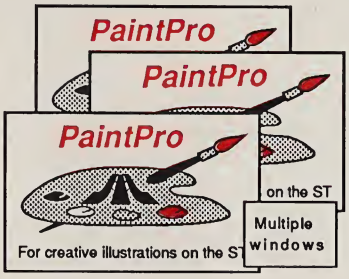

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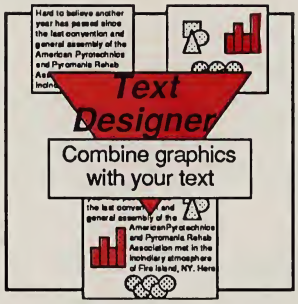

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object of the engineers' efforts, and they lose their focus as time passes and no one ever asks them for a marketable design.

"The other side of the coin, however, is that if you don't continually challenge existing technology, you will create nothing more than a me-too product. Not incorporating new technologies in your designs is like working with your hands tied."

We left Shivji's office feeling quite secure about Atari's place in the hardware market—both now and in the future. "But what computer," we asked ourselves, "has ever made a dent in the market without software support? What is Atari doing about software support for the ST?"

ST Software

In search of the answer to that question, we walked around the corner to talk with Sigmund Hartmann, president of software for Atari, and Richard Frick, who is responsible for development and marketing of ST software.

Both Hartmann and Frick were excited about the recent signing of a contract with Microsoft to produce a version of the best-selling Microsoft *Word* for the ST. The program, which will be known as Microsoft *Write*, will bring professional word processing capability to the ST line.

***If you don't** continually challenge existing technology, you will create nothing more than a me-too product.*

According to Hartmann, the contracts with Microsoft for *Word* and VersaSoft for *dbMan* reflect Atari's determination to license the best software currently available and, if necessary, convert it for the ST. These products will be sold and supported by Atari through its large dealer network and customer service department.

Atari has very high standards for the programs that it licenses. Frick and his staff examine each one carefully, evaluating, among other things, the utility, ease of use, quality of documentation, and overall excellence of the implementation.

From the beginning, Atari has gone out of its way to assist third parties in the development of software for the ST. A comprehensive developer's kit provides detailed information on both hardware and software, and Hartmann's staff is available to work with developers in creating or translating existing programs for the 16-bit machines.

It is to this policy of strong support for third-party manufacturers that Hartmann attributes many of the 300 packages listed in Atari's Spring 1986 ST Software Catalog and which makes him confident that the next edition will include perhaps double that number.

To further aid developers in porting packages over to the ST, Atari is currently developing emulators that will let ST owners run Apple and IBM software virtually out of the box. The availability of these devices should open the floodgates for ST software, bringing hundreds of new business, professional, and educational packages to the Atari market.

As for the future of ST software, what do Hartmann and Frick see ahead? Continued support of third-party developers, an ongoing search for the best software to license, and continued commitment to Atari's long-standing policy of upward compatibility.

Onward To The Future

What's in the works? Neil Harris took us for a walk through Atari's research and development laboratories. It turned out to be an education, both in Atari's recent past and in its future.

"There's the original ST," he said, pointing to an outsized collection of hand-wired circuit boards, arranged around a central hub like spokes on a wheel. "While it was in development, we called it the Cray. [Subunits of the Cray X-MP supercomputer are, similarly, arranged 'in the round.']"

"And look at this!" Harris said, laughing. "This is the ST at a later stage of development." He gestured at a somewhat neater single-board prototype, occupying about twice the area of present models, its entire surface copiously arrayed with chips. "What's interesting about this is that it represents what the ST would be if we had built it to the same chip density as the Macintosh. There would have been many, many more chips, and it would have been half as reliable and three times as expensive as it is now."

"And there's the Blitter," he said, pointing out a pair of RGB displays hooked to skeletal STs. "This one on the left is a standard ST, running an animation demo. The one on the right has the Blitter built in. It's a block transfer graphics chip that can increase the speed of screen access up to about 16 times what is possible with the current hardware."

We stood, amazed, and watched the demonstration—a low-resolution, 16-color timelapse of birds flying across the screen—run in both environments. The difference was amazing—the left-hand system paused for a visible instant between frames, while the enhanced system just blew through the loop with perfect, canned-video quality. According to Harris, the Blitter will be built into future ST systems and will be available to owners of existing systems as an affordable upgrade.

"This programmer," he continued, indicating a young man poised over a glowing terminal, "is putting the finishing touches on the new GDOS. It's an enhancement to GEM that handles graphic functions, like font tables, and coordinates device drivers for laser printers and other high-resolution peripherals."

"And look at that," said Harris, pointing to a monitor. We recognized Barbi Benton, the *Playboy* center-fold. Indeed we did more than recognize her—the picture was so detailed that we could count her goosebumps.

"A new video controller?" we asked.

"That's not video," he answered. "It's being produced by . . ."

But then he made us promise not to tell. Watch these pages for more information as the future of Atari takes shape and becomes an important part of your present. ■

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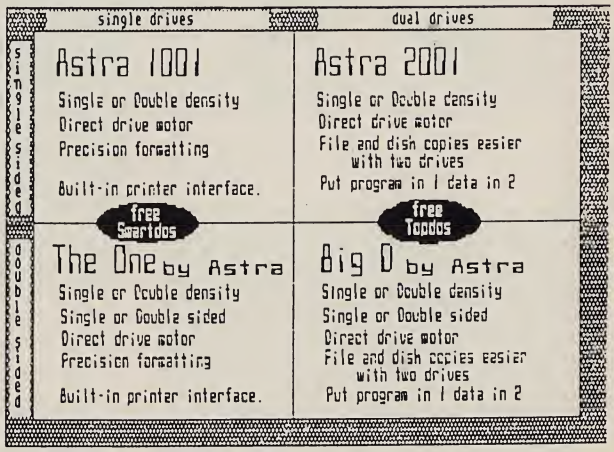

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Developers display unprecedented support for Atari computers at Summer Consumer Electronics Show

Good Show!

By BETSY STAPLES

It was easy to spot the Atari owners and supporters at this year's Summer CES in Chicago—they were the ones walking on air. Their heads rose farther above the crowd and their grins widened as they moved from booth to booth, collecting literature and watching demos of dozens of new products for their favorite computers.

Atari had a booth about the size of the lot my sister's house sits on in suburban Chicago, and it was packed with Atari's own hardware and software and developers displaying Atari-compatible products in mini-booths. At times you could barely elbow your way through the showgoers clustered around the demos.

Great excitement was generated on the hardware front by Atari's announcement of the XEP80, a peripheral that gives the Atari XE line 80-column display capability. The XEP80, which plugs into a joystick port, allows 80-column output to a standard monochrome composite monitor and is compatible with all Atari 8-bit computers. Expected to retail for $80, the XEP80 also allows the user to connect a standard centronics parallel printer.

And speaking of printers, the new XMM801 for the XE line supports Epson medium-resolution graphics. Printing up to 80 characters per second, the new printer requires no special interface to the Atari XE. It accommodates both friction and tractor feed paper and uses cartridge style ribbons. The XMM801 retails for $219.

New for the XE on the software side are *Atari Planetarium* and *Star Raiders II*.

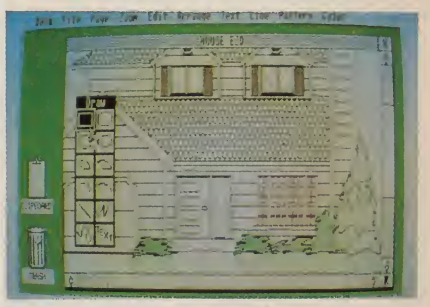
Atari Planetarium is an education title designed to bring a complete observatory into the user's home or classroom. It features more than 1200 stars, 88 constellations, and more than 300 deep-sky objects, and traces the recent appearance of Halley's Comet. Star charts and maps can be printed on the XMM801 or any Epson graphics capable printer. The program sells for $24.95.

Star Raiders II is an arcade-style game long awaited by players who became addicted to its predecessor, the 1981 computer-game-of-the-year. Atari's latest game for the XE retails for $19.95.

Among the programs being shown by third-party developers was Softworks Basic, an enhanced version of Basic for the Atari 520ST by **Softworks Limited** [2944 N. Broadway, Chicago, IL 60657, (312) 975-4030]. The language consists of a compiler, which converts source files created by the editor into tokenized files; a runtime system, which executes the tokenized files; and a support library that includes sample programs and Atari interface files. The package retails for $79.

New from **Activision** [2350 Bayshore Frontage Rd., Mountain View, CA 94043, (413) 960-0410] is *Paintworks*, a comprehensive paint program and graphics editor, which takes advantage of the graphics and color capabilities of Atari ST computer systems. The program, designed by Audio Light, features many graphics options as well as compatibility with Activision's *Music Studio* for the ST. *Paintworks*, which retails for $69.95, is reviewed elsewhere in this issue.

Also reviewed in this issue is *Easy Draw* from **MiGraph** [720 S. 333, Ste. 201, Federal Way, WA 98003, (206) 838-4677], which was on display at CES. The program allows creation of 3-D illustrations, business graphics, and



line drawings. Features include two drawing windows, a pop-up menu, and a wide range of line styles and widths. The package sells for $149.95.

Make It Move for the ST allows one to use a paint program to generate and display graphics and animation sequences. Created by **Avila Associates** [3646 Baker Lane, Lafayette, CA 94549, (415) 284-5982], *Make It Move* features video transitions, zooms, and fades, and sells for $49.95.

For those who prefer prefab graphics, **Unison World Inc.** [2150 Shattuck Ave., Ste. 902, Berkeley, CA 94704, (415) 848-6666] announced *PrintMaster* for the Atari ST. This menu-driven collection of hi-res images, borders, background patterns, and type fonts, allows the user to create cards, signs, calendars, banners, and stationery. Unison World also offers a line of colored computer paper and ribbons, and *Art Gallery I*, a disk of additional graphics. *PrintMaster* sells for $39.95, and *Art Gallery I*, for $29.95.

Hi Tech Expressions [2699 Bayshore Dr., Ste. 1000A, Coconut, FL 33133,

(305) 854-2318] has introduced *HeartWare*, an XL/XE-based friendship and love note card maker. Users can copy animated messages to disk and send them to friends—either alone or in combination with full- or quarter-page printouts of graphics from the master disk. *PartyWare*, also from Hi Tech Expressions, is a complete party planning kit, which prints banners, party hats, ribbons, placemats, and place cards as well as a party planning checklist, game ideas, and thank you notes. *HeartWare* sells for $9.95, and *PartyWare* for $14.95.

Broderbund announced that *The Print Shop Companion* is now available for Atari XL/XE computers. Features allow the user to create new *Print Shop* graphics; move, mirror, invert, or flip graphics automatically; draw lines, boxes, and ovals; and add text to graphics. Retail price is $34.95.

Covox, Inc. [675-D Conger St., Eugene, OR 97402, (503) 342-1271] was demonstrating the *Speech Construction Set*, a speech editing program for use with the Covox Voice Master speech and music system for the Atari 800XL, and 130XE. The program features a cut-and-paste function with which the user can isolate and relocate portions of his own speech. He can also vary length, change pitch, reverse, vary

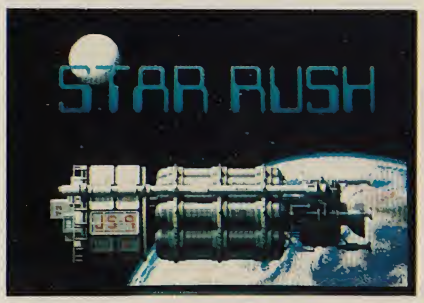
loudness, and otherwise modify individual bits. The Voice Master retails for $89.95, and *Speech Construction Set*, for $39.95.

Entertainment

Sublogic [713 Edgebrook Dr., Champaign, IL 61820, (800) 637-4983] was featuring an ST version of their best-selling *Flight Simulator*, a program that puts the user in the pilot's seat of a small private plane. For those who prefer a faster craft, Sublogic has *Jet*, a

program that simulates flight in a high performance jet. The programs sell for $39.95 each.

In a suite downtown, **Master Designer Software** was previewing Cinemaware for the ST. Designed for the mature player, Cinemaware programs are interactive movies combining classic movie themes and characters with the sophisticated graphics of the ST. The player assumes the role of a gangster, a medieval knight, a space-age warrior, or Sinbad the Sailor, and his on-screen character grows, changes, and adapts each time the game is played. Adult romance, arcade-style sequences, and film techniques add entertainment value to the programs. Cinemaware will be distributed by **Mindscape** [3444 Dundee Rd., Northbrook, IL 60062, (800) 221-9884, in IL (800) 942-7315].

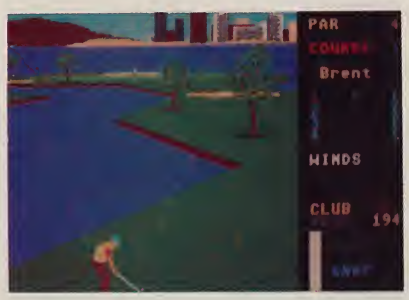


Activision [2350 Bayshore Frontage Rd., Mountain View, CA 94043, (415) 960-0410] announced the release of *Hacker II: The Doomsday Papers*, a strategy adventure simulation based on adventures begun in *Hacker*. With no rules and few clues, the player is expected to thwart a plot to destroy the United States. The program retails for $49.95.

MicroProse Software [120 Lakefront Dr., Hunt Valley, MD 21030 (301) 667-1151, (800) 645-8632] was showing *Conflict in Vietnam*, its latest release for Atari XL/XE computers. A simulation of the decisive battles of the Vietnam War, the program includes five self-contained games, which chronicle the pivotal events of the War from the end of French rule at Dien Bien Phu in 1954 to the North Vietnamese assault on Quang Tri in 1972. The player is cast in the role of battlefield commander, issuing orders that direct the constantly moving armies across a scrolling map.

Also announced by MicroProse was *Gunship* for the XL/XE and ST. This simulation of an AH-64 Apache Helicopter Gunship puts the player in the pilot's seat and features multiple weapon and navigation systems, joystick control, and 3-D graphics that enable him to maneuver among buildings and terrain features at high speed. Both MicroProse programs retail for $39.95 in Atari versions

Also showing a golf simulator of the ST was **Access Software** [#A 2562 S. 1560 West, Woods Cross, UT 84087, (801) 298-9077]. *Leader Board, the Pro Golf Simulator* provides players



with a perspective view of the game. Features include multiple 18-hole courses, 3-D animation, a handicap system, and three levels of play. It carries a suggested retail price of $39.95.

Strategic Simulations [1046 Rengstorff Ave., Mountain View, CA 94043, (415) 964-1353] announced *Gettysburg: The Turning Point*, a tactical civil war game that allows players to keep track of individual artillery, men, and ammunition for each brigade unit. One or two players can engage in the entire three-day battle that took place July 1–3, 1863 or play any one of the three days separately. The game, available for 8-bit Atari systems, sells for $59.95.

Polarware/Penguin Software [Box 311, Geneva, IL 60134, (312) 232-1984] was featuring the interactive novels *Oo-Topos*, *The Crimson Crown*, *The Coveted Mirror*, and *Transylvania* for the ST, and during the show, President Mark Pelczarski announced price reductions on all of the company's software. The interactive novels and fantasy roll-playing games are now priced at $17.95 for 5.25″ disks and $19.95 for 3.5″ disks.

Firebird Licensees [P.O. Box 49, Ramsey, NJ 07446, (201) 934-7373], a wholly-owned subsidiary of British Telecommunications, launched *The Pawn*, a graphic adventure game for the ST. The program features a subtle storyline and a text handling system that allows input of complicated sentences and complex interaction with characters. *The Pawn*, which sells for $44.95, is reviewed elsewhere in this issue.

Among the new releases for 800XL/XE and ST systems from **Mastertronic International** [7311B Grove Rd, Frederick, MD 21701, (301) 695-8877], another newcomer to U.S. shores, is *Ninja*. This martial arts simulation features authentic multi-combat fight routines and action sequences and sells for $9.95.

Epyx [600 Galveston, Redwood City, CA 94063, (415) 366-0606] announced the release of three of its best-selling titles for the Atari ST. *Temple of Apshai Trilogy* is a classic adventure role-playing game in which players seek treasures, slay monsters, cross deserts, and surmount other assorted dangers and difficulties. The object of *Rogue* is to avoid trap doors, deadly darts, sleeping gas, and similar obstacles and find the Amulet of Yendor. *Winter Games* features seven Winter Olympic events: bobsledding, ski jumping, figure skating, free style skating, speed skating, hot dogging, and the biathlon. The games sell for $34.95.

Sierra [P.O. Box 485, Coarsegold, CA 93614, (209) 683-6858] was showing ST versions of some of its popular graphic adventures: *King's Quest II: Romancing the Throne*, *Ultima II: Revenge of the Enchantress*, and *Black Cauldron*, a graphic adventure based on the Disney film. Sierra's games retail for $49.95 and $59.95.

Artworx [150 N. Main St., Fairport, NY 14450) also demonstrated support for the ST by releasing new versions of some of its classics. The mouse-driven *Bridge 4.0* now features full graphic display of the player's hand and even allows him to be dealt good cards all the time. And for those who find their skills need work, there is *Compubridge*, a bridge tutorial covering all aspects of

the game. Both bridge programs list for $29.95. For the less intellectually inclined, there is *Strip Poker* for $39.95. *Hole In One Golf* covers all aspects of the game, including custom design of the golf course. It sells for $29.95.

Come to think of it, golf was a very popular theme at the show. **Accolade** [20833 Stevens Creek Blvd., Cupertino, CA 95014, (408) 446-5757] launched *Mean 18* for the ST, a golf simulator

featuring such well known courses as St. Andrews, Augusta National, and Pebble Beach; 72 different holes; a golf course architect; and many strategy and play options. List price is $44.95.

Datasoft [19808 Nordhoff Pl., Chatsworth, CA 91311, (818) 886-5922] was showing several new games for 8-bit Atari systems. *221B Baker Street* leads the player from the home Sherlock Holmes through the streets of London, to gather clues in 30 different cases. *Crosscheck*, a new concept in crossword puzzle games, can be played by up to four people, all of who attempt to build continuous word chains. *The Never Ending Story* is an adventure/fantasy game based on the book and film of the same name, and *Mind Pursuit* is a test of intelligence, knowledge, and trivia with three levels of difficulty. All of the above games list for $29.95. Datasoft also announced *Alternate Reality—The City* and *Alternate Reality—The Dungeon*, both 3-D adventures for the ST.

Baudville [1001 Medical Park Dr., SE, Grand Rapids, MI 49506, (616) 957-3036] announced three new recreational programs for Atari computers. *Video Vegas* includes computerized blackjack, poker, slot machine, and keno. *Guitar Wizard* teaches the user to play the guitar, and *Ted Bear's Rainy Day Games* is a collection of activities for young people. All three packages will be available for both 8-bit and ST systems at $29.95 and $34.95.

Personal/Professional Productivity

Batteries Included [30 Mural St., Richmond Hill, Ont. L4B 1B5, Canada, (416) 881-9941] has launched "a major new product initiative in support of Atari computers." The new product line includes the following:

*I*S Talk*, a GEM-based telecommunications program, which includes a memory-resident 50,000-word spelling checker and three levels of macros. Suggested list price is $79.95.

A telecommunications program is also part of the ST version of the popular *HomePak*; an integrated package

that includes a word processor and a database manager. The three-program package sells for $49.95.

A new version of *PaperClip* for the Atari 130XL has been released. The enhanced program includes the *SpellPack* spelling checker, which offers a dictionary of more than 36,000 words. The package retails for $59.95.

*I*S PaperClip Elite*, a "next generation" word processor, has standard word processing functions plus a real-time spelling checker, an idea processor, independent linked windows, integrated text and graphics, and more. It lists for $99.95.

*I*S Degas Elite*, designed to allow creation of everything from business graphics to original art, features flexible control of colors, multiple text fonts, and fill and brush patterns. Advanced graphics features include SHADOW, MAGNIFY, FLIP, SCALE, and ROTATE. Graphics can be exported to *PaperClip Elite* to create a desktop publishing system. The package sells for $79.95.

The Isgur Portfolio System is an in-

vestment management program designed by Lee Isgur of Paine Webber, NY. It allows the automatic updating of portfolios with the latest data from online services and includes many analytical features. *IPS* retails for $199.95.

BTS The Spreadsheet includes key mathematical, statistical, and financial functions from addition to net present value, as well as the logical operators AND and TRUE/FALSE. Maximum worksheet size is 1000 rows × 1000 columns. *BTS* sells for $69.95.

TimeLink is an electronic diary program that allows users to schedule time more effectively. If offers day, week, month, and year at a glance, and a change in one automatically causes the rest to be updated. With database functions, information can be saved, extracted, and summarized. Suggested list price is $49.95.

Thunder, a writer's assistant package, can be called up from within any GEM-based ST application. If offers a 50,000-word spelling checker and an abbreviations function to support database, communications, word processing, and other word-oriented programs. It sells for $39.95.

Answer: *1040ST*™

Question: *Which computer is the first in the world to give you 1 Megabyte of power for under $1,000?*

The 1040ST is a major breakthrough in personal computers. Indeed, it's the world's first computer with an original list price that represents less than $1 per kilobyte.

To give you an idea of what an extraordinary accomplishment that is, let's look at the price-per-kilobyte figures for some well-known competitors.

The Macintosh,™ for example, comes in at over $4 per kilobyte, the Amiga™ is over $5 per kilobyte and the PC AT™ is a whopping $9.

In contrast, the 1040ST comes in at an incredible 98 cents per kilobyte and a total price of just $999.95 for the complete system: CPU, disk drive and high-resolution monochrome monitor.

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AT is a trademark of International Business Machines, Inc.
Macintosh is a trademark licensed to Apple Computer, Inc.
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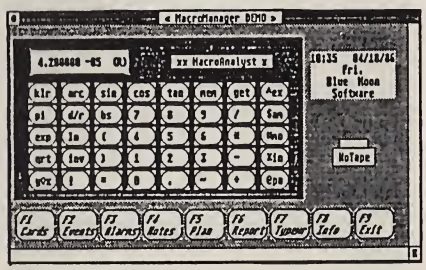
When we walked by **Haba Systems** [6711 Valjean Ave., Van Nuys, CA 91406, (818) 901-8828], they were demonstrating *HabaView* for the ST, an "intuitive database" that allows information to be viewed in both list mode and zoomed in record mode. Data can be rearranged at the click of the mouse button. Just one member of Haba's line of personal productivity packages for the ST, *HabaView* sells for $74.95.

Timeworks [444 Lake Cook Rd., Deerfield, IL 60015, (312) 948-9200] launched three new programs for the ST at the show. *Word Writer ST*, "a state-of-the-art, professional word processing system," includes an 85,000-word spelling checker and integrated Thesaurus, on-screen highlighting, built-in outlining, and pull-down menu, along with most of the standard word processing functions.

Swiftcalc ST is a spreadsheet program, which offers super high-resolution graphics. The *Sideways* option allows the user to print on one page a spreadsheet report that is wider than the printer paper. *Data Manager ST*, a general information storage and retrieval system featuring report writing, graphics, and label making capabilities, includes Timeworks' x-search, x-sort, and x-chart functions. Each of the Timeworks programs carries a suggested retail price of $89.95.

Quickview Systems [146 Main St., Ste. 404, Los Altos, CA 94022, (415) 965-0327] was showing *Zoomracks*, a data manager based on the concept of an "electronic rack." In a format inspired by the racks in which employees often keep their time cards, the program allows the user to view up to ten racks at once and relate them with macros, making the structure of the database itself virtually invisible. The package sells for $79.95.

Blue Moon Software [13322 W. 105th, Lenexa, KS 66215, (913) 492-8219] was showing *MacroDesk*. This GEM desktop accessory, accessible from other GEM applications, includes an 18-function calculator with ten memories and algebraic and RPN notation, an alarm clock/calendar, an electronic card file database, and an event log. *MacroMath* is a GEM application program for math and matrix functions, featuring a scientific calculator, a matrix math function processor, and a batch or on-line equation processor. *MacroManager*, another GEM accessory, provides all of the features of *MacroDesk* plus project time recording and analysis and a project scheduling worksheet.



Among the many programs for the Atari ST now available from **Michtron** [576 S. Telegraph, Pontiac, MI 48053, (313) 334-5700] are several personal/professional productivity tools. *BBS 2.0* is an easy-to-install bulletin board system; *Business Tools* includes 200 business forms, letters, and contracts; *Calendar*, a desktop accessory, prints calendars and maintains a daily appointment schedule; *Cornerman* includes a notepad, calculator, address/phone book and dialer, ASCII chart, clock, and game; *Echo* uses X-10 plug-in modules to create a wireless remote control system; *Mi-Term* is a full-featured smart terminal program with GEM interface; *Mighty Mail* is a mailing list manager that prints labels, mailing lists, and phone books; and *Personal Money Manager* is a complete financial program for the home or small office. These packages range in price from $29.95 to $79.95.

Academy Software [P.O. Box 6277, San Rafael, CA 94903, (415) 499-0850] announced that *Typing Tutor Word Invaders* is now available for Atari ST computers as well as the 400/800/XL/XE series. Designed to teach touch typing to computer users of all ages, the program couches the lessons in a game format. Suggested retail price for the ST disk is $34.95. The disk for all other Atari machines is $24.95.

In the **Classic Image** [510 Rhode Island Ave., Cherry Hill, NJ 08002, (609) 667-2526] booth, was a demonstration of *Disk Library*, a program for the ST designed to create order out of the chaos that reigns in most users' disk files. Features include filing, categorization, and cross referencing of each disk, folder, and file in the user's library; creation of a permanent record of each of the above; automatic update as disks, folders, and files are added to the library; printing of files by name, category, size, or date; and display of total number of disks, folders, and programs and total bytes used and available per disk or in the complete library. *Disk Library* retails for $49.95.

"In this business, Bosworth, we do not let the chips fall where they may."

Hardware

ICD, Inc. [1220 Rock St., Rockford, IL 61101, (815) 968-2228] announced the ICD Multi I/O Board, a parallel device that adds four functional devices to a 130XE or 800XL. Prices start at $199.

Also available from ICD is the P:R:Connection, a small replacement for the Atari 850 interface, which provides a standard Centronics printer port and two RS-232 serial ports. It supports all 850 XIO commands except the buffers command, and requires no power supply. The P:R:Connection retails for $79.95. The Printer Connection, which sells for $59.95, is an interface for parallel printers. The electronics are molded into the printer end of the cable, and steel ears allow it to lock firmly into place.

The Rambo XL is an internal memory upgrade kit, which makes the Atari 800 and 1200XL memory compatible with the 130 XE. It sells for $39.95. Specialized cables are also available from ICD. A 6′ printer cable, which can be used to connect the P:R:Connection, ICD MIO, or Atari 850 to a standard parallel printer, and a 6′ modem cable, which can be used to connect any of the above devices to a modem using a standard DB25 connector, sell for $14.95 each.

PaceMark Technologies [400 N. Franklin St., Chicago, IL 60610, (312) 923-9022] was showing the Falcon ACS 3000, which automatically controls three personal computers, allowing them to share one parallel printer. A 64K or 128K buffer permits any or all of the computers to be used while printing is taking place, and a priority function allows one computer to take precedence over the others. The ACS3000 with a 64K buffer retails for $449.95; with 128K, it sells for $589.95.

Star Micronics [200 Park Ave., Ste. 3510, New York, NY 10166, (212) 986-6770] introduced the NX-10 printer, featuring print speeds of 120 cps in draft mode and 30 cps in near letter quality mode, front panel print command display and controls, rear tractor feed for improved paper handling, and automatic single sheet loading. Optional cut sheet feeders are available to meet high volume requirements. Suggested retail price is $349.

Okidata [532 Fellowship Rd., Mt. Laurel, NJ 08054, (609) 235-2600] was demonstrating the Okimate 20 color printer with an Atari ST. In addition to printing more than 100 colors, the Okimate 20 features a 24-element printhead, which prints text at 80 cps in standard mode and 40 cps in near letter quality mode. Users can print either 80 standard columns or 132 columns of condensed type. Available fonts include wide, boldface, and italics, and underlining, superscripts, and subscripts are standard. The suggested list price of $268 includes the Plug 'N Print module.

Hippopotamus Software [985 University Ave., Ste. 12, Los Gatos, CA 95030, (408) 395-3190] was showing their Atari ST video digitizer. With resolution of 320 × 250 and up to 16 greylevels, the digitizer can be used to print black and white images, which can also be edited using *Neochrome* or *Degas*. The digitizer, which plugs into the ST cartridge slot, accepts a standard NTSC, SECAM, or PAL video signal. It sells for $139.95.

Answer: *1040ST*™

Question: *Which computer was specially designed for people who hate to wait?*

Let's face it, any time you spend waiting on a computer is time wasted. That's why Atari® built the 1040ST with a sizzling clock speed of 8 MHz.

And with 1024K bytes of Random Access Memory, the ST™ gives you an incredible combination of power and speed. (The PC AT,™ for example, has 512K of memory.)

So you'll spend time working on your ST, instead of waiting on it.

In addition, the 1040ST costs an amazingly low $999.95, which makes it the first computer in the world to deliver 1 Megabyte of memory for under $1,000. (The PC AT costs about $4,500.)

So if you haven't checked out the ST yet, what are you waiting for?

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ATARI®

They look like sunglasses.

Vision Breakthrough

When I put on the pair of glasses what I saw I could not believe. Nor will you.

By Joseph Sugarman

I am about to tell you a true story. If you believe me, you will be well rewarded. If you don't believe me, I will make it worth your while to change your mind. Let me explain.

Len is a friend of mine who has an eye for good products. One day he called excited about a pair of sunglasses he owned. "It's so incredible," he said, "when you first look through a pair, you won't believe it."

"What will I see?" I asked. "What could be so incredible?"

Len continued, "When you put on these glasses, your vision improves. Objects appear sharper, more defined. Everything takes on an enhanced 3-D effect. And it's not my imagination. I just want you to see for yourself."

When I received the sunglasses and put them on I couldn't believe my eyes. I kept taking them off and putting them on to see if indeed what I was seeing through the glasses was indeed actually sharper or if my imagination was playing tricks on me. But my vision improved. It was obvious. I kept putting on my cherished $100 pair of high-tech sunglasses and comparing them. They didn't compare. I was very impressed. Everything appeared sharper, more defined and indeed had a greater three dimensional look to it. But what did this product do that made my vision so much better? I found out.

DEPRESSING COLOR

The sunglasses (called BluBlockers) filter out the ultraviolet and blue spectrum light waves from the sun. You've often heard the color blue used for expressions of bad moods such as "blue Monday" or "I have the blues." Apparently, the color blue, for centuries, has been considered a rather depressing color.

For eyesight, blue is not a good color too. There are several reasons. First, the blue rays have the shortest wavelength in the visible spectrum (red is the longest). As a result, the color blue will focus slightly in front of the retina which is the "focussing screen" onto which light waves fall in your eye. By eliminating the blue from the sunglasses through a special filtration process, and only letting those rays through that indeed focus clearly on the retina, objects appear to be sharper and clearer.

The second reason is even more impressive. It is not good to have ultraviolet rays fall on our eyes. Recognized as bad for skin, uv light is worse for eyes and is believed to play a role in many of today's eye diseases. In addition, people with contact lenses are at greater risk because contacts tend to magnify the light at their edges thus increasing the sun's harmful effects.

Finally, by eliminating the blue and uv light during the day, your night vision improves. The purple pigment in your eye called Rhodopsin is affected by blue light and the eyes take hours to recover from the effects.

SUNGLASS DANGER

But what really surprised me was the danger in conventional sunglasses. Our pupils close in bright light to limit the light entering the eye and open wider at night—just like the aperture in an automatic camera. So when we put on sunglasses, although we reduce the amount of light that enters our eyes, our pupils open wider and we are actually allowing more of the blue and ultraviolet portions of the light spectrum into our eyes.

BluBlockers sunglasses are darker at the top to shield out overhead light. The lens used is the CR-39 which most eye doctors will tell you is one of the finest materials you can use for glasses and is manufactured under license.

The frames are some of the most comfortable I have ever worn. The moulded nose rest will fit any nose. The hinge causes the frames to rest comfortably on your face and can be adjusted for almost any size face.

We also have a clip-on pair that weighs less than one ounce. Both come with a padded carrying case and an anti-scratch coating.

I urge you to order a pair and experience the improved vision. Then take your old sunglasses and compare them to the BluBlockers. See how much clearer and sharper objects appear with BluBlockers. And see if your night vision doesn't improve as a direct result. If you don't see a dramatic difference in your vision—one so noticeable that you can tell immediately, then send them back anytime within 30 days and I will send you a prompt and courteous refund.

DRAMATIC DIFFERENCE

But from what I've personally witnessed, once you use a pair, there will be no way you'll want to return it.

Astronomers from many famous universities wear BluBlockers to improve their night vision. Pilots golfers, skiers, athletes—anyone who spends a great deal of time in the sun have found the BluBlockers indispensable.

Our eyes are very important to us. Protect them and at the same time improve your vision with the most incredible breakthrough in sun glasses since they were first introduced. Order a pair or two at no obligation, today.

To order, credit card holders call toll free and ask for product by number shown below or send a check plus $4 for delivery.

BluBlockers (0020 S) **$59.95**
Clip-On Model (0022 S) **34.95**

BluBlockers is a trademark of JS&A Group, Inc.

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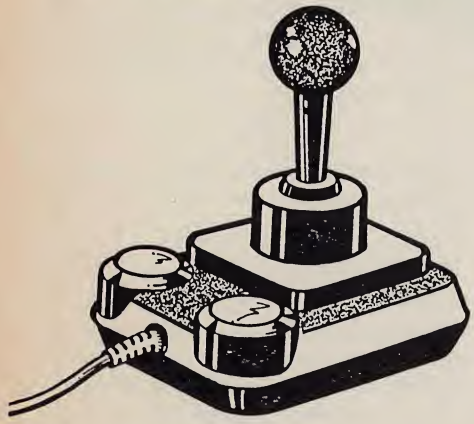
Accessories

Competition Pro, a division of Coin Controls, Inc. [1000 A Touhy Ave., Elk Grove, IL 60007, (312) 228-1810] announced the newest addition to its line of rugged, high quality joysticks, the Model 5000 with Microswitches. Designed for use with Atari computers, the Model 5000 features microswitches and two fire buttons, and comes in black or beige. Suggested retail price is $19.95.



Shanner International [453 Ravendale Dr., Mountain View, CA 94043, (800) 828-6637] was featuring a line of disk management systems from Innovative Technologies. The Pyramid, the Pocket Pak, the Disc Directory, The Easel, and the Library, all designed to provide safe and tidy storage of either 5.25″ or 3.5″ floppy disks, hold between 10 and 80 disks and range in price from $13.95 to $49.95. Also designed by Innovative Technologies was the Speed Pad, a mouse pad, which boasts a grid pattern on the smooth coated surface. It sells for $29.95.

American Covers [P.O. Box 1796, Sandy, UT 84091, (801) 566-3100], maker of the furry Mouse-House mouse slipcover, was also showing more serious covers for a wide range computers and peripherals. Lite-Line light weight covers are treated with a special antistatic backing and fold compactly when not in use. Suggested retail prices range from $7.95 to $16.95. American Covers also covers disks with Floppy Wallets. Each wallet holds nine 3.5″ or 12 5.25″ disks in a tri-fold case. Prices are $10.95 and $16.95.

Suncom [260 Holbrook Dr., Wheeling, IL 60090] announced a line of roll-top oak media storage cabinets. Diskit 3.5 holds up to 48 microdisks, Diskit 5.25 holds 60 minifloppies or 12 CDs, and Double Diskit 5.25 holds up to 120 minifloppies or 24 CDs.

Panamax [150 Mitchell Blvd., San Rafael, CA 94903, (415) 472-5547] was showing SuperMax, one of the few protection devices available to protect against brownouts for modems along with other electronic equipment. SuperMax offers four receptacles, two phone jack receptacles, a 6′ cord, an on/off switch, a circuit breaker, and noise and brownout protection. It retails for $149.

Networx [203 Harrison Pl., Brooklyn, NY 11237, (718) 821-5487] had on display the Wire Cube Plus. A low cost surge protector designed for computers and modems, the Wire Cube Plus carries a five-year warranty. Suggested retail price is $39.95. ■

Answer: *1040ST*™

Question: *Which computer builds in multiple features instead of hidden costs?*

It seems that a lot of our competitors design stripped down computers, and then charge extra for every feature and upgrade you add.

Atari® doesn't do that, because we believe the features and level of performance you want should be built in to begin with.

That's why the 1040ST gives you a full Megabyte of memory. While the competition only gives you the chance to spend big dollars trying to improve their memories.

Another trick they use is to make sure their interfaces don't meet industry standards, so you're locked into their system. In contrast, the ST™ uses standard interfaces across the board, such as the RS-232C port for serial modem communications and the parallel interface for an industry standard printer.

Of course, the ST's best built-in is the price, which is an incredible $999[95]!

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ATARI®

Patterns For Victory

A popular playground activity provides the model for pattern searching in games.

What is that gaggle of kids doing, counting "one-two-three" and thrusting their hands into the center of the circle? Ah, yes! They are playing Paper, Scissors, and Rock—pure psychological warfare—no element of chance, no board or game tokens to limit your next move, no physical prowess needed. Just mind against mind. Let me see. How good is my computer at reading minds?

Rules: The players simultaneously make a gesture, either a rock (fist) scissors (two fingers) or paper (flat hand). The player showing paper beats one showing rock (because paper covers rock) and loses to scissors (because scissors cut paper). Rock beats (can smash) scissors.

Winning depends on anticipating your opponent's moves, which in turn depends on modeling his thoughts. Will he try to guess your next move and then move to beat it? Or more defensively, will he just pick a pattern that you might think is unlikely, and so have a "heads I win, tails I break even" situation? More than likely he will vacillate between various tactics.

Trying to anticipate your opponent's move leads to infinite regression and very tangled reasoning. "I just displayed paper and lost to his scissors. Should I, therefore, do rock to beat his scissors? That assumes he will repeat scissors. But if he thinks I think he will do that, he will do paper to beat my rock. Perhaps I should just display paper again, because he will not expect me to repeat a losing move. But I did that a few moves ago, and he may be expecting it again. What to do?"

The first problem facing the player is choosing the level of analysis. The paragraph above shows a typical human-motives analysis. The programmer fashioning tactics for the computer to use finds it much easier to watch for patterns in the play than to model the human opponent's thinking process. This exploits the strengths of the computer—accurate memory of large quantities of data and accurate calculation of probabilities.

The program in Listing 1 lets you play against a sly troll called Crafty, who roams between the CPU and the keyboard of your computer. Crafty keeps careful track of the moves you make in the game, accumulating statistics about your pattern of play. In the array S( ), he totals the moves you most often make following any given pair of moves. For example, if your first moves in a game were:

PPRPRS . . .

Crafty would have entered the following in his books:

PP is followed by R once
PR is followed by P once and by S once
RP is followed by R once

(Of course, P, S, and R stand for paper, scissors, and rock.)

Then as he plays, Crafty assumes that you will tend to repeat patterns that you have often made in the past and chooses moves to beat you on the average. Enter the program in Listing 1 and see if Crafty can pin you in this game of mind wrestling.

Crafty must deal with several issues in pattern detection. For example, does a human's pattern of play depend only on his own previous moves, or also on Crafty's moves? Answer: I don't know! I asume here that it depends only on the human's moves, but you can easily change the program to accommodate the other approach.

How long should a pattern be observed? Answer: It depends on how many moves make up a game. Only in long games can Crafty accumulate enough information about long patterns to do him any good. In Listing 1, I first tried patterns that were three moves long, but found that Crafty was a poor opponent in games of 38 moves. This is not surprising; three moves with three choices for each means that 27 different patterns can occur, fewer than two occurrences in each game, and not very good statistics.

There is also the question of meta-patterns. A human seeing PPPSSS

By EDWARD H. CARLSON

would not be surprised to see RRR next, but Crafty would be blind to this kind of pattern, it being too subtle for his present stage of mental development.

Well, who should you bet on, Crafty or the human player? It depends on the human. Crafty carves up anyone who is mystified by his decision-making process. But there are two ways to make patterns that baffle Crafty. One is to make a random pattern, that is, no consistent pattern at all. Modify the routine at line 400 by replacing the human player with randomly generated moves. Such a random pattern should win about half the games against Crafty—not a very exciting outcome. You would have to play a large number of games to see the law of averages at work, however. In a series of 100 games, Crafty would most likely win between 45 and 55 of them.

You need a trickier tactic to defeat Crafty decisively. To outwit him, make a pattern seem to appear, then break it to your advantage. This requires some careful maneuvering. You cannot afford to lose very many turns establishing your pattern before switching to get the payoff. But with a little practice, you can become so good at this that it is hard not to beat Crafty consistently.

Such reverse pattern generation may become more challenging if you change the scoring to something akin to the "strikes" rule in bowling, giving extra points to wins on consecutive turns. It then becomes more costly for the human to establish a pattern to reverse.

In any event, I have deliberately left Crafty at an early stage in his development so you can have the fun of helping him grow to invincibility against human players. As a first step, look at the information he displays on the screen, the information he uses in choosing a move. You probably should suppress the printing of those clues before turning Crafty loose on your friends.

Here are some more ideas for refining Crafty's tactics. In line 710, if there is a tie among the best-move entries in the table, he takes the last one he finds. Better to confuse the human player by not letting him know which of the tied best-moves Crafty will actually use, so add an RND( ) here somehow. Also let Crafty keep track of both two- and three-letter patterns, and then late in the game, when three-letter patterns may have built up reasonable statistics (at least in some cases), let him chose his move based on the three-letter data.

If Crafty sees himself losing by quite a bit, he should be willing to gamble on a change of tactics. ("Quite a bit" should be more than 6 points in a 36-move game or 10 points in a 100-move game.)

Listing 1.

```
10 DIM L$(25),MS$(480),I$(40),RD$(1),MV$(9)
19 REM **L IS LENGTH OF OBSERVED PATTERN**
20 L=3:DIM S(L^L-1)
29 REM **CLEAR MESSAGE STRING AND READ IN MESSAGES**
30 MS$=" ":MS$(480)=MS$:MS$(2)=MS$
40 FOR I=1 TO 12:READ I$:MS$(40*I-39,40*I)=I$:NEXT I
49 REM **CLEAR STATISTICS ARRAY**
50 FOR I=0 TO L^L-1:S(I)=0:NEXT I
60 FS=0:DV=L^(L-1):YS=0:CS=0:R=1
69 REM **CRAFTY'S FIRST MOVE WILL BE RANDOM**
70 CM=INT(RND(0)*3):RD$="?"
79 REM **SET UP SCREEN, OPEN KEYBOARD, ISTRUCTIONS**
80 POKE 82,0:POKE 752,1
90 SETCOLOR 1,0,15:SETCOLOR 2,12,6:SETCOLOR 4,2,12
100 OPEN #1,4,0,"K:"
110 GOSUB 1000:PRINT
120 PRINT "Crafty says ...":PRINT
130 PRINT "Welcome to the classic game of Paper,"
140 PRINT "Scissors, and Rock. In each turn, you"
150 PRINT "will press a key, selecting <P>aper,"
160 PRINT "S>cissors, or <R>ock. I will do the"
170 PRINT "same thing, at the very same instant."
180 PRINT
190 PRINT "Each object is superior to one of the"
200 PRINT "remaining two, and subordinate to the"
210 PRINT "other. Winning means anticipating which"
220 PRINT "object your opponent will select and"
230 PRINT "choosing an object of higher priority."
240 PRINT "The rules of opposition are ..."
250 PRINT
260 PRINT "          ROCK breaks SCISSORS,"
270 PRINT "          SCISSORS cut PAPER, and"
280 PRINT "          PAPER wraps ROCK.":PRINT
290 PRINT "        (Press any key to play.)";
299 REM **WAIT FOR KEY. SET UP GAME SCREEN**
300 GET #1,K:GOSUB 1000:PRINT
310 POSITION 16,2:PRINT "ROUND:"
320 POSITION 8,3:PRINT "YOU:"
330 POSITION 20,3:PRINT CHR$(124)
340 POSITION 25,3:PRINT "CRAFTY:"
350 PRINT "      ---------------+---------------"
360 FOR I=5 TO 15:POSITION 20,I:PRINT CHR$(124):NEXT I
370 POSITION 2,18:PRINT "Crafty says ..."
379 REM **PRINT SCORES AND CURRENT ROUND**
380 POSITION 13,3:PRINT YS:POSITION 33,3:PRINT CS
390 POSITION 23,2:PRINT T
400 POSITION 2,20
409 REM **PRINT IMPATIENT MESSAGE**
410 P=INT(RND(0)*3)+4:PRINT MS$(P*40-39,P*40);
419 REM **WAIT FOR KEY, PRINTING RANDOM MESSAGES**
420 TIM=INT(RND(0)*100)+200
430 POKE 764,255
440 IF PEEK(764)<>255 THEN K=PEEK(764):GOTO 470
450 TIM=TIM-1:IF TIM>0 THEN 440
460 GOTO 400
469 REM **HAS USER PRESSED "P," "S," OR "R?"**
470 IF K<>10 AND K<>62 AND K<>40 THEN 430
479 REM **RING BELL, PRINT CRAFTY'S WAR WHOOP**
480 PRINT CHR$(253):POSITION 2,20
490 P=INT(RND(0)*3)+7:PRINT MS$(P*40-39,P*40);
```

(continued)

Listing 1. (continued)

```
500 FOR D=1 TO 100:NEXT D
509 REM **DECODE YOUR MOVE**
510 YM=(K=62)+2*(K=40)
519 REM **SET UP L$ FOR DISPLAY OF BOTH MOVES**
520 L$=" ":L$(25)=L$:L$(2)=L$:L$(13,13)=CHR$(124)
530 P=YM:GOSUB 2000:L$(1,LEN(MV$))=MV$
540 P=CM:GOSUB 2000:MV$(LEN(MV$)+1)=RD$
550 L$(16)=MV$
559 REM **SCROLL DISPLAY AND ADD NEW LINE**
560 POSITION 0,5:PRINT CHR$(156)
570 POSITION 0,17:PRINT CHR$(157)
580 POSITION 8,15:PRINT L$
589 REM **DETERMINE IF DRAW, OR WHO WON**
590 IF YM=CM THEN P=12:GOTO 620
600 IF YM-1+3*(YM=0)=CM THEN P=11:YS=YS+1:GOTO 620
610 CS=CS+1:P=10
619 REM **PRINT APPROPRIATE MESSAGE**
620 POSITION 2,20:PRINT MS$(P*40-39,P*40);
630 FOR D=1 TO 500:NEXT D
640 POSITION 2,20
649 REM **PRINT DELAYING MESSAGE**
650 P=INT(RND(0)*3)+1:PRINT MS$(P*40-39,P*40);
659 REM **UPDATE STATISTICS BASED ON THIS MOVE**
660 FS=FS+YM
670 IF R>=L THEN S(FS)=S(FS)+1
680 FS=(FS-INT(FS/DV)*DV)*L
689 REM **IF STATS EXIST, TRY TO PREDICT NEXT MOVE**
690 IF R<L THEN 740
700 MX=0:PN=0:FOR I=FS TO FS+L-1
710 IF S(I)>MX THEN MX=S(I):PN=I
720 NEXT I
730 IF MX<>0 THEN CM=PN-FS:CM=CM+1-3*(CM=2):RD$="!":GO
TO 750
739 REM **OTHERWISE, MOVE AT RANDOM**
740 CM=INT(RND(0)*3):RD$="?"
750 FOR D=1 TO 300:NEXT D:R=R+1:GOTO 370
999 REM **PRINT TITLE**
1000 PRINT CHR$(125)
1010 POSITION 7,0:PRINT "**PAPER, SCISSORS, ROCK**"
1020 RETURN
1999 REM **CONVERT MOVE TO APPROPRIATE OBJECT**
2000 IF P=0 THEN MV$="PAPER":GOTO 2030
2010 IF P=1 THEN MV$="SCISSORS":GOTO 2030
2020 MV$="ROCK"
2030 RETURN
3000 DATA Wait a second ...
3010 DATA Hold it ... counting stuff up here ...
3020 DATA Hmmm ... wait ... wait ...
3030 DATA Okay! Let's rock! (So to speak ...)
3040 DATA Let's go ... c'mon ... press a key ...
3050 DATA Hup ho! Here we go! Ready!
3060 DATA KOWABUNGA!!!!!
3070 DATA HAI-Ya-a-á-a-a-a-a-a!!!
3080 DATA KUNG-FU!!!!!
3090 DATA Ha! I win! I win! WINNAH! WINNAH!
3100 DATA You win. Don't look so smug ...
3110 DATA It's a draw ... Nice weather eh?
```

For example, he could reverse his "best move" choice, at least part of the time. If the patterns say the human is likely to play paper, which would ordinarily cause Crafty to play scissors and win, he could assume the human anticipates this and will play rock to beat the scissors. Then Crafty's double think-ahead would tell him to play paper to beat the human's rock. If you do not want so sophisticated a fix, perhaps just throwing in a few random moves now and then would confuse the human opponent enough to let Crafty regain his advantage. Then again, perhaps not.

For some of you, the give-and-take banter of a game is the best part. And there is certainly a lot of room for improvement in Crafty's comments. Increase the variety of comments for a talkative Crafty, making them refer to the last play on your side and on his side, and whether he won, lost, or tied the last move, and by how much he is behind or ahead.

In this game, "the more players the merrier" is especially true, because unlike most games, the scoring is *nontransitive*. (*Transitive* means if A beats B and B beats C then A beats C. This is not the case in Paper, Scissors, and Rocks.) Extend this game so that there are three players, either two humans and Crafty or a sister to Crafty—one who wants to beat both of you and who uses different tactics than Crafty.

Even if Paper, Scissors, and Rock is not your first choice in game entertainment, you can learn about pattern searching as applied to games by playing it. Construct smart computer programs on this model for your favorite card or board game—any game in which a series of moves by a given player, or all the players together, may reveal patterns that can be used to pick the best next move. ■

Bottom Line

What will that co-op really cost? This program gives a close approximation of what the real yearly cost of owning a co-op will be.

By SEAN KELLY

Co-ops: sometimes a great investment, sometimes a financial disaster. Determining fairly accurately what the *real* cost of co-op ownership will be can help you decide between a good co-op deal and one that will keep you financially strapped for years to come.

Unfortunately, the mathematics of cost-projection are complex and tedious to do by hand. Your Atari, however, in combination with the program presented at the end of this article, can do the calculations in a flash—projecting what the total cost of owning a particular co-op will be over the next ten years. With the help of this program, you can compare different co-op offers, mortgages, and other options; winnow out the combinations that promise financial trouble; and make an informed decision when it is time to buy.

Expenditures related to owning a co-op fall into three basic categories. The first, naturally enough, is the cost of buying the co-op itself—generally with financing provided by a mortgage. The second is the cost of paying off your share of the "underlying debt" on the co-op property, while the third includes ongoing expenses such as property taxes, heating of common areas, co-op assessments, regular repair and maintenance costs, shareholders' suits, capital improvements, etc., some of which are predictable, others not. Payments for debt service and debt retirement, property taxes, and certain other costs comprise the bulk of your monthly "maintenance" payment.

Your Two Mortgages

Your mortgage (or co-op loan) represents the largest single component of the cost of owning a co-op. It represents a considerable outlay of capital, not only in mortgage payments, but in points, closing costs, and other up-front fees. The first step in determining the real cost of a contemplated co-op purchase, therefore, is to project what your yearly mortgage payments will be and what tax benefits—in terms of dollars—you will derive from them.

The second step, in most cases, is to perform a similar analysis of costs and benefits relating to your share of the underlying debt owned by the co-op corporation. Viewed simply, this is, in effect, a second mortgage. Your share of the payments is generally proportional to the number of co-op shares you own.

Mortgage rates come in two flavors: fixed and floating. Fixed-rate mortgages impose, as their name suggests, a constant rate of interest over the amortization term or life of the mortgage—the amount of time it would take to pay off the mortgage. Payments on the principal and interest of a fixed-rate mortgage remain the same from year to year, and tax benefits accruing from the interest portion of such payments are fairly easy to project.

Floating-, or adjustable-rate mortgages (ARMs), on the other hand, impose rates that change periodically, usually varying with fluctuations in a predetermined cost-of-capital indicator like the prime rate of interest, interest rate on T-bills, etc. Thus payments on an ARM can increase and/or decrease over the life of the mortgage, as can the tax benefits accruing from such payments. Because of this potential for fluctuation, the mathematics of projecting costs and benefits of ARMs is complex and requires some degree of precognition in the matter of interest rates.

To side-step these problems, our program assumes that both your own mortgage and current financing on the underlying debt of the co-op follow fixed-rate principles. To compute payments on your own mortgage, the program asks for the original amount, yearly rate, and amortization term. If the mortgage is an "all interest" or "balloon" loan, enter an O when prompted for the amortization term. The program also asks for the present age of the mortgage in years, so that it can compute the current balance. If yours is a new mortgage, enter zero (0) at this prompt.

To determine the current balance of financing on the underlying debt and project what you will pay into it over the coming years, the program asks how many shares of the co-op you own, how many shares exist in total, the original amount of the underlying debt, the yearly rate, the amortization term, and the current age of its financing (most of this information will be available in the

***The real dollar value** of tax deductions derived from mortgage payments and other co-op related expenditures is a function of your marginal tax bracket.*

co-op prospectus). Again, if "all interest" financing is in effect, enter an O when prompted for the amortization term. Note that the program assumes that *neither* mortgage will have to be refinanced during the ten-year projection period. The program will judge and respond correctly if either mortgage reaches term during the projection period.

If either your mortgage or the corporation's has an adjustable rate, the program can still be used. You will, however, have to supply a single average interest rate for purposes of projection, as the program treats everything in fixed-rate terms. It is probably best to run the program several times for each subject property, supplying a range of rates that will, in your estimation, bracket the upper and lower limits of interest rate fluctuation during the term of financing. This way, you can have both "best case" and "worst case" scenarios in hand.

Taxes, Benefits, and Your Bracket

The interest portions of both your personal mortgage payments and your pro-rata payments into the underlying debt are tax-deductible. The program automatically figures the dollar value of these deductions into its projection.

Points and other fees related to closing your personal mortgage may also be deductible, in whole or in part. Deductions for some of these costs may be taken "up front" (in the year of closing). However, according to recent tax rulings, deductions for others (particularly for points) must be spread over the entire term of the mortgage.

If you are contemplating a new mortgage, the program asks you to supply three dollar figures for up-front expenses: non-deductible expenses, expenses that may be deducted in full immediately, and expenses for which deductions must be spread over the mortgage term. If your mortgage has been in effect for some time, the program asks for only the original dollar amount of up-front costs to be amortized, as these are the only costs that will figure in future projection.

The real dollar value of tax deductions derived from mortgage payments and other co-op related expenditures is a function of your *marginal* tax bracket—the percentage of tax you pay on the highest dollars of your taxable income. To determine your marginal bracket, the program asks you to enter your taxable income after all deductions not related to the co-op have been made. It also asks you to supply your filing status.

Important Note on Taxes

At the time of this writing, it seems very likely that the tax structure will undergo reform prior to fiscal year 1987. The program is thus designed to compute deductions according to the new tax structure.

Note also that the program performs its projection under the assumption that your taxable income will not change during the projection period.

Other Costs

During the projection period, you will incur certain deductible and non-deductible expenses in addition to those relating directly to the mortgage and underlying debt. Some of these, like property taxes and heating of common areas, comprise the remainder of your maintenance payment. The rest represent additional costs of ownership—regular repair and maintenance costs, assessments, capital improvement costs mandated by the board of directors, and other expenditures.

Some of these costs are predictable. Others can be estimated. Some—like property taxes—are deductible, while others are not. To incorporate these costs and the tax benefits derived from them, the program asks you to input what you think the total sum of deductible expenses and the total sum of non-deductible expenses will be for each year of the projection term. Some of these expenses will be detailed in the co-op prospectus. For those that are not, you will have to make your own (preferably conservative) estimates.

About The Programs

The 8-bit version of Co-op Cost Analysis is written in standard Atari Basic and should, as noted in the Atari Key, below, run on any Atari home computer with 48K or more of RAM. A printer is optional.

The ST version of Co-op Cost Analysis is written in Atari Logo, a sophisticated dialect of the Logo language that is well-adapted to the kind of recursive calculations this program performs. If you are not familiar with Logo, we suggest you review the introductory chapters of the ST Logo manual for instructions on how to enter and save Logo programs.

Once the Logo listing is typed in and saved to disk, the program can be run by entering the word COOP at the Logo "?" prompt. You will be asked to resize the Logo Dialogue window to full-screen size (using the mouse) before proceeding. Thereafter, all data entry is via the ST keyboard. Again, the use of a printer is optional.

Final Notes

As it stands, the program assumes that you intend to use the co-op under examination as a principal place of residence—not as a rental investment. If you do plan to rent the property, you must determine the cost of getting and keeping a renter (typically, one to two month's rent per year), the depreciation tax benefit, the expense of additional maintenance, etc., and add these figures appropriately to the sums of deductible and non-deductible expenses for each year of the projection.

Note: Every effort has been made to assure that the programs shown below are as accurate as possible. They can be used to stimulate your thinking on the ramifications of a co-op purchase for your personal financial situation, but, given their inherent limitations and the number of variables that must be taken into account, they can not and should not be considered a substitute for the services of a qualified financial advisor. Your financial advisor can appreciate and account for factors unique to your situation and help you make the best choice when buying a home. ■

Atari 8-bit Computers * Co-op Cost Analysis

To run this program, you will need:

* **Any Atari home computer with 48K RAM or greater.**
* **Atari Basic.**
* **Optional: printer.**

```
10 DIM TAX(12),M(36,2),AD(10,2),I$(20),N$(20),D$(3)
20 FOR I=1 TO 12:READ V:TAX(I)=V:NEXT I
30 OPEN #2,4,0,"K:":POKE 82,0
40 GOSUB 2000:PRINT
50 PRINT "Enter net taxable income before"
60 PRINT "co-op related deductions ($)";
70 L=0:H=999999:GOSUB 3000:NETINC=V
80 PRINT
90 PRINT "Please select filing status ..."
100 PRINT :PRINT "1) Single":PRINT "2) Married"
110 PRINT :PRINT "(1 or 2)";
120 L=1:H=2:GOSUB 3000:FSTAT=V
130 IF FSTAT<>1 AND FSTAT<>2 THEN 110
140 GOSUB 2000:PRINT
150 PRINT "For your personal mortgage, enter ..."
160 I=1:PRINT :GOSUB 4000
170 GOSUB 2000:PRINT
180 PRINT "Regarding up-front costs incurred"
190 PRINT "in closing, enter ...":PRINT
200 IF M(2,1)<>0 THEN 250
210 PRINT "Non-deductible costs ($)";
220 L=0:H=1000000:GOSUB 3000:NDCOSTS=V
230 PRINT "Immediately-deductible costs ($)";
240 GOSUB 3000:IDCOSTS=V
250 PRINT "Costs for which deductions must be"
260 PRINT "spread over mortgage term ($)";
270 GOSUB 3000:ADCOSTS=V
280 GOSUB 2000:PRINT
290 PRINT "For your co-op's underlying debt,"
300 PRINT "enter ..."
310 I=2:PRINT :GOSUB 4000
320 GOSUB 2000:PRINT
330 PRINT "Regarding co-op shares ..."
340 PRINT "How many do you own";
350 L=0:H=1000000:GOSUB 3000:YRSHR=V
360 PRINT "How many exist in all";
370 GOSUB 3000:TOTSHR=V
380 GOSUB 2000:PRINT
390 PRINT "For additional costs, incurred yearly"
400 PRINT "during 10-year projection period,"
410 PRINT "enter ...":PRINT
420 L=0:H=1000000:FOR I=1 TO 10
430 PRINT "Non-deductible costs, Yr. ";I;"($)";
440 GOSUB 3000:AD(I,1)=V
450 PRINT "Deductible costs, Yr. ";I;"($)";
460 GOSUB 3000:AD(I,2)=V
470 NEXT I
480 GOSUB 2000:PRINT
490 PRINT "Processing data ... please wait."
500 M(3,2)=M(3,2)*YRSHR/TOTSHR
510 T=M(1,1):A=M(3,1):R=M(4,1):GOSUB 5000:M(5,1)=V
520 T=M(1,2):A=M(3,2):R=M(4,2):GOSUB 5000:M(5,2)=V
530 I=1:GOSUB 6000:I=2:GOSUB 6000
540 GOSUB 2000:PRINT
550 PRINT "Do you want to <p>rint or"
560 PRINT "<d>isplay the report";
570 INPUT I$:IF LEN(I$)>1 THEN 550
580 I$=CHR$(ASC(I$)-32*(ASC(I$)>96))
590 IF I$<>"P" AND I$<>"D" THEN 550
600 IF I$="D" THEN 660
610 PRINT "Make sure your printer is ready,"
620 PRINT "then press any key to begin."
630 GET #2,K:OPEN #1,8,0,"P:"
640 LO=PEEK(838):HI=PEEK(839)
650 POKE 838,PEEK(854):POKE 839,PEEK(855):CLOSE #1
660 FOR I=1 TO 10
670 IF I$="D" THEN PRINT CHR$(125);:GOTO 690
680 PRINT :PRINT
690 PRINT "              *** YEAR: ";I;"***"
700 F=(I-1)*3+6
710 PRINT "FOR YOUR MORTGAGE ..."
720 PRINT "CLOSING BALANCE:";
730 V=M(F,1):GOSUB 7000
740 PRINT "PAYMENT:";
750 V=M(5,1):GOSUB 7000
760 PRINT "INTEREST PORTION (DED.):";
770 V=M(F+1,1):GOSUB 7000
780 PRINT "PRINCIPAL PORTION:";
790 V=M(F+2,1):GOSUB 7000
800 IF I>1 OR M(2,1)<>0 THEN 850
810 PRINT "NON-DED. UP-FRONT COSTS:";
820 V=NDCOSTS:GOSUB 7000
830 PRINT "DED. UP-FRONT COSTS:";
840 V=IDCOSTS:GOSUB 7000
850 PRINT "AMORT. PART UP-FRONT COSTS:";
860 V=ADCOSTS/M(1,1):GOSUB 7000
870 PRINT "-----------------------------------"
880 PRINT "FOR UNDERLYING DEBT ..."
890 PRINT "CLOSING BALANCE:";
900 V=M(F,2):GOSUB 7000
910 PRINT "PAYMENT:";
920 V=M(5,2):GOSUB 7000
930 PRINT "INTEREST PORTION (DED.):";
940 V=M(F+1,2):GOSUB 7000
950 PRINT "PRINCIPAL PORTION:";
960 V=M(F+2,2):GOSUB 7000
970 PRINT "-----------------------------------"
980 PRINT "ADD'L. NON-DED. COSTS:";
990 V=AD(I,1):GOSUB 7000
1000 PRINT "ADD'L. DED. COSTS:";
1010 V=AD(I,2):GOSUB 7000
1020 PRINT "-----------------------------------"
1030 PRINT "TOTAL EXPENSE:";
1040 TOT=M(5,1)+M(5,2)+AD(I,1)+AD(I,2)+(NDCOSTS+IDCOST
S)*(I=1)+ADCOSTS/M(1,1)
1050 V=TOT:GOSUB 7000
1060 PRINT "TOTAL DEDUCTIONS:";
1070 V=M(F+1,1)+M(F+1,2)+AD(I,2)+ADCOSTS/M(1,1)
1080 GOSUB 7000
1090 PRINT "DOLLAR VALUE DEDUCTIONS:";
1100 GOSUB 8000:GOSUB 7000
1110 PRINT "EXPENSE AFTER DEDUCTIONS:";
1120 V=TOT-V:GOSUB 7000
1130 IF I$="P" THEN 1150
1140 PRINT "     PRESS ANY KEY TO CONTINUE.";:GET #2,K
1150 NEXT I:IF I$="P" THEN POKE 838,LO:POKE 839,HI
1160 GOSUB 2000:PRINT
1170 PRINT "Would you like to ...":PRINT
1180 PRINT "<r>eview the report, or"
1190 PRINT "<q>uit?";
1200 GET #2,K:K=K-32*(K>96)
1210 IF K=ASC("R") THEN 540
1220 IF K<>ASC("Q") THEN 1200
1230 END
2000 PRINT CHR$(125)
2010 POSITION 10,0:PRINT "*CO-OP COST ANALYSIS*"
2020 RETURN
3000 INPUT I$
3010 TRAP 3030:V=VAL(I$)
3020 IF V>=L AND V<=H THEN TRAP 40000:RETURN
3030 PRINT "Please try again ..."
3040 GOTO 3000
4000 PRINT "Amortization term (in years)";
4010 L=0:H=100:GOSUB 3000:M(1,I)=V
4020 PRINT "Present age of mortgage (in years)";
4030 GOSUB 3000:M(2,I)=V
4040 PRINT "Original amount ($)";
4050 H=10000000:GOSUB 3000:M(3,I)=V
4060 PRINT "Interest rate (%)";
4070 H=99.9:GOSUB 3000:M(4,I)=V/100
4080 RETURN
5000 IF T=0 THEN V=A*R:GOTO 5020
5010 V=A*R/(1-(R+1)^-T)
5020 RETURN
6000 B=M(3,I):P=M(5,I):R=M(4,I):F=6
6010 FOR YR=1 TO M(2,I)+10
6020 IF B=0 THEN IN=0:PR=0:GOTO 6050
6030 IN=B*R:PR=P-IN:B=B-PR
6040 IF B<1 THEN B=0
6050 IF YR>M(2,I) THEN M(F,I)=B:M(F+1,I)=IN:M(F+2,I)=P
R:F=F+3
6060 NEXT YR:RETURN
7000 DBDP=INT(CLOG(V+1.0E-03))+1:IF DBDP<0 THEN DBDP=0
7010 V=INT(V*100)/100
7020 N$=STR$(V)
7030 IF LEN(N$)=DBDP OR N$="0" THEN N$(LEN(N$)+1)=".00
":GOTO 7050
7040 IF LEN(N$)>DBDP THEN N$(LEN(N$)+1)="00":N$=N$(1,D
BDP+3)
7050 PRINT "$";N$:RETURN
8000 J=FSTAT*4:D=0:S=NETINC:E=NETINC-V
8010 P=TAX(J-(FSTAT-1)*4+8)
8020 IF TAX(J)<E THEN V=D+(S-E)*P:RETURN
8030 IF S>TAX(J) THEN D=D+(S-TAX(J))*P:S=TAX(J)
8040 J=J-1:GOTO 8010
9000 DATA 0,17850,43150,89560
9010 DATA 0,29750,71900,149250
9020 DATA 0.15,0.28,0.33,0.28
```

Atari ST Computers * Co-op Cost Analysis

To run this program, you will need:

- **Any Atari ST computer.**
- **Atari Logo.**
- **Monochrome monitor, RGB monitor, or television.**
- **Optional: printer.**

```
TO COOP
   INITIALIZE
   INPUT_DATA
   PROCESS_DATA
   REPORT
END

TO INITIALIZE
   MAKE "TAX [0 17850 43150 89560 0 29750 71900 149250
 0.15 0.28 0.33 0.28]
   CLEARTEXT
   PRINT [Before proceeding ...] SPACE 2
   PRINT [Please re - size the dialogue window]
   PRINT [to fill the entire screen, then]
   PRINT [press any key to begin.]
   MAKE "KEY WAIT_FOR_KEYPRESS
END

TO INPUT_DATA
   GET_NET_INCOME_AND_FILING_STATUS
   MAKE "MORTGAGE GET_ANNUITY_FACTS [For your personal
 mortgage ...]
   GET_CLOSING_COSTS
   MAKE "UNDEBT GET_ANNUITY_FACTS [For your co - op's
underlying debt ...]
   GET_SHARES_INFO
   GET_ADDITIONAL_COSTS
END

TO PROCESS_DATA
   TITLE SPACE 1
   PRINT [Please wait ... processing data.]
   MAKE "UNDEBT SETITEM 3 :UNDEBT (ITEM 3 :UNDEBT) * :
YOUR_SHARES / :TOTAL_SHARES
   MAKE "MORTGAGE LPUT YEARLY_PAYMENT :MORTGAGE :MORTG
AGE
   MAKE "UNDEBT LPUT YEARLY_PAYMENT :UNDEBT :UNDEBT
   MAKE "DUMMY PROJECT ((ITEM 2 :UNDEBT) + 10) :UNDEBT

   MAKE "UNDEBT SE :UNDEBT TAIL 30 :DUMMY
   MAKE "DUMMY PROJECT ((ITEM 2 :MORTGAGE) + 10) :MORT
GAGE
   MAKE "MORTGAGE SE :MORTGAGE TAIL 30 :DUMMY
END

TO REPORT
   PRINTCHECK
   PAGELOOP
   ENDCHECK
END

TO GET_NET_INCOME_AND_FILING_STATUS
   TITLE
   PRINT [Enter net taxable income before]
   TYPE [co - op related deductions ($) :]
   MAKE "NET_INCOME NUM 0 999999
   LABEL "LOOP
   SPACE 2
   PRINT [Please select filing status ...]
   SPACE 1
   PRINT [1) Single]
   PRINT [2) Married]
   SPACE 1
   TYPE [(1 - 2) :]
   MAKE "FILING_STATUS NUM 1 2
   IF (OR (:FILING_STATUS < 1) (:FILING_STATUS > 2)) [
GO "LOOP]
END

TO GET_ANNUITY_FACTS :W
   (LOCAL "DUMMY)
   MAKE "DUMMY []
   TITLE PRINT :W SPACE 1
   TYPE [Enter original amortization term (in years) :
]
   MAKE "DUMMY LPUT NUM 0 100 :DUMMY
   TYPE [Enter present age of mortgage (in years) :]
   MAKE "DUMMY LPUT NUM 0 100 :DUMMY
   TYPE [Enter original amount ($) :]
   MAKE "DUMMY LPUT NUM 0 10000000 :DUMMY
   TYPE [Enter interest rate (%) :]
   MAKE "DUMMY LPUT (NUM 0 99) / 100 :DUMMY
   OUTPUT :DUMMY
END

TO GET_CLOSING_COSTS
   TITLE
   PRINT [Regarding up - front costs incurred in closi
ng ...]
   SPACE 1
   IF (ITEM 2 :MORTGAGE <> 0) [GO "OVER]
   TYPE [Enter total of non - deductible costs ($) :]
   MAKE "ND_COSTS NUM 0 999999
   TYPE [Enter total of immediately - deductible costs
 ($) :]
   MAKE "ID_COSTS NUM 0 999999
   LABEL "OVER
   PRINT [Enter total of costs for which deductions mu
st]
   TYPE [be spread over mortgage term ($) :]
   MAKE "AD_COSTS NUM 0 999999
END


TO GET_SHARES_INFO
   TITLE
   PRINT [Regarding co - op shares ...]
   LABEL "LOOP
   SPACE 1
   TYPE [How many shares do you own? :]
   MAKE "YOUR_SHARES NUM 0 10000000
   TYPE [How many shares exist in all? :]
   MAKE "TOTAL_SHARES NUM 0 10000000
   IF (:TOTAL_SHARES < :YOUR_SHARES) [PRINT [Those fig
ures seem to be in error ...] GO "LOOP]
END

TO GET_ADDITIONAL_COSTS
   TITLE
   PRINT [For additional costs, incurred yearly during
]
   PRINT [10 - year period of projection ...]
   SPACE 1
   MAKE "COSTS_NON []
   MAKE "COSTS_DED []
   MAKE "I 1
   LABEL "LOOP
   TYPE SE [Enter non - deductible costs for year] SE
:I [($) :]
   MAKE "COSTS_NON LPUT NUM 0 999999 :COSTS_NON
   TYPE SE [Enter deductible costs for year] SE :I [($
) :]
   MAKE "COSTS_DED LPUT NUM 0 999999 :COSTS_DED
   MAKE "I :I + 1
   IF (:I < 11) [PR " GO "LOOP]
END

TO PRINTCHECK
   TITLE SPACE 1
   LABEL "LOOP1
   TYPE [Do you wish your report printed (Y / N) ?]
   MAKE "PKEY UC READQUOTE
   IF (AND (:PKEY <> "Y) (:PKEY <> "N)) [GO "LOOP1]
   IF (:PKEY = "N) [STOP]
   PRINT [Please make sure your printer is ready.]
   PRINT [Then press any key to proceed ...]
   MAKE "KEY READCHAR COPYON
END

TO PAGELOOP
   MAKE "I 1
   LABEL "TOPLOOP
   CT EMITS 33 42
   TYPE SE [YEAR :] :I
   EMITS 35 42 PRINT "
   MORTFAX :I
   MORTTOT :I
   DEBTFAX :I
   ADDTOT :I
   TOTPAGE
   IF (:I < 10) [MAKE "I :I + 1 GO "TOPLOOP]
   COPYOFF
END

TO ENDCHECK
   TITLE SPACE 2
   LABEL "TRYAGAIN
   SPACE 1
   PRINT [Would you like to ...] SPACE 1
   PRINT [(r) eview this report, or]
   PRINT [(q) uit?]
   MAKE "KEY UC READCHAR
   IF (:KEY = "R) [REPORT]
   IF (:KEY <> "Q) [GO "TRYAGAIN]
END

TO MORTFAX :I
   PRINT SE [Balance of mortgage at year - end :] $ IT
EM OF :I :MORTGAGE
   PRINT SE [Payment :] $ ITEM 5 :MORTGAGE
```

```
   MAKE "TOT_COST ITEM 5 :MORTGAGE
   PRINT SE [Interest portion of payment (deductible)
:] $ ITEM (OF :I) + 1 :MORTGAGE
   MAKE "TOT_DED ITEM (OF :I) + 1 :MORTGAGE
   PRINT SE [Principal portion of payment :] $ ITEM (O
F :I) + 2 :MORTGAGE
END

TO MORTTOT :I
   IF (OR (:I > 1) ((ITEM 2 :MORTGAGE) <> 0)) [GO "OVE
R2]
   PRINT SE [Non - deductible up - front costs :] $ :N
D_COSTS
   PRINT SE [Deductible up - front costs :] $ :ID_COST
S
   MAKE "TOT_COST :TOT_COST + :ND_COSTS + :ID_COSTS
   MAKE "TOT_DED :TOT_DED + :ID_COSTS
   LABEL "OVER2
   PRINT SE [Amortized portion of up - front costs for
 deduction (if any) :] $ :AD_COSTS / ITEM 1 :MORTGAGE
   MAKE "TOT_COST :TOT_COST + :AD_COSTS / ITEM 1 :MORT
GAGE
   MAKE "TOT_DED :TOT_DED + :AD_COSTS / ITEM 1 :MORTGA
GE
END

TO DEBTFAX :I
   PRINT SE [Balance of underlying debt at year - end:
] $ ITEM OF :I :UNDEBT
   PRINT SE [Payment :] $ ITEM 5 :UNDEBT
   MAKE "TOT_COST :TOT_COST + ITEM 5 :UNDEBT
   PRINT SE [Interest portion of payment (deductible)
:] $ ITEM (OF :I) + 1 :UNDEBT
   MAKE "TOT_DED :TOT_DED + ITEM (OF :I) + 1 :UNDEBT
   PRINT SE [Principal portion of payment :] $ ITEM (O
F :I) + 2 :UNDEBT
END

TO ADDTOT :I
   PRINT SE [Additional non - deductible costs :] $ IT
EM :I :COSTS_NON
   PRINT SE [Additional deductible costs :] $ ITEM :I
:COSTS_DED
   MAKE "TOT_COST :TOT_COST + (ITEM :I :COSTS_NON) + (
ITEM :I :COSTS_DED)
   MAKE "TOT_DED :TOT_DED + (ITEM :I :COSTS_DED)
END

TO TOTPAGE
   PRINT SE [Total of all expenses :] $ :TOT_COST
   PRINT SE [Total of all deductions :] $ :TOT_DED
   PRINT SE [Dollar value of deductions :] $ DVAL :TOT
_DED
   PRINT SE [Overall expense after deductions :] $ :TO
T_COST - DVAL :TOT_DED
   COPYOFF
   CENTER [* * * Press any key to continue * * *]
   MAKE "KEY READCHAR
   IF (:PKEY = "Y) [COPYON]
END

TO YEARLY_PAYMENT :L
   (LOCAL "ONE_DOLLAR_FIGURE "TERM "AMOUNT "RATE)
   MAKE "TERM ITEM 1 :L
   MAKE "AMOUNT ITEM 3 :L
   MAKE "RATE ITEM 4 :L
   IF (:TERM > 0) [MAKE "ONE_DOLLAR_FIGURE :RATE / (1
- (:RATE + 1) ^ -:TERM)] [MAKE "ONE_DOLLAR_FIGURE :RAT
E]
   OUTPUT (:AMOUNT * :ONE_DOLLAR_FIGURE)
END

TO PROJECT :N :L
   (LOCAL "DUMMY "BALANCE "RATE "PAYMENT)
   MAKE "BALANCE ITEM 3 :L
   MAKE "RATE ITEM 4 :L
   MAKE "PAYMENT ITEM 5 :L
   MAKE "DUMMY []
   OUTPUT (AMORTIZE INT :N :BALANCE :RATE :PAYMENT)
END

TO AMORTIZE :N :BALANCE :RATE :PAYMENT
   (LOCAL "INTEREST "PRINCIPAL)
   IF (:N = 0) [OUTPUT :DUMMY]
   IF (:BALANCE = 0) [MAKE "INTEREST 0 MAKE "PRINCIPAL
 0 GO "DONE]
   MAKE "INTEREST :BALANCE * :RATE
   MAKE "PRINCIPAL :PAYMENT - :INTEREST
   MAKE "BALANCE :BALANCE - :PRINCIPAL
   IF (:BALANCE < 1) [MAKE "BALANCE 0]
   LABEL "DONE
   MAKE "DUMMY SE :DUMMY SE :BALANCE SE :INTEREST :PRI
NCIPAL
   AMORTIZE :N - 1 :BALANCE :RATE :PAYMENT
END

TO DVAL :VALUE
   MAKE "J :FILING_STATUS * 4
   MAKE "D 0
   MAKE "S :NET_INCOME
   MAKE "E :NET_INCOME - :VALUE
   LABEL "LOOP
   MAKE "Q ITEM :J :TAX
   MAKE "P ITEM (:J - (:FILING_STATUS - 1) * 4 + 8) :T
AX
   IF (:Q < :E) [OUTPUT :D + (:S - :E) * :P]
   IF (:S > :Q) [MAKE "D :D + (:S - :Q) * :P MAKE "S :
Q]
   MAKE "J :J - 1
   GO "LOOP
END


TO SETITEM :N :NAME :VALUE
   (LOCAL "FP "LP)
   IF (:N = 1) [OUTPUT FPUT :VALUE BUTFIRST :NAME STOP
]
   IF (:N = COUNT :NAME) [OUTPUT LPUT :VALUE BUTLAST :
NAME STOP]
   MAKE "FP PIECE 1 :N - 1 :NAME
   MAKE "LP PIECE :N + 1 COUNT :NAME :NAME
   IF (WORDP :NAME) [OUTPUT WORD :FP WORD :VALUE :LP]
[OUTPUT SE :FP SE :VALUE :LP]
END


TO CHARS_IN :L ;COUNT CHARACTERS IN AN OBJECT
   IF (WORDP :L) [OUTPUT COUNT :L] [OUTPUT STRIPCNT :L
 -1 + COUNT :L]
END

TO STRIPCNT :L :N ;COUNT CHARACTERS IN A LIST, RECURSI
VELY
   IF (EMPTYP :L) [OUTPUT :N]
   STRIPCNT BUTFIRST :L :N + COUNT FIRST :L
END

TO WAIT_FOR_KEYPRESS
   OUTPUT (READCHAR)
END

TO CENTER :L ;CENTER AND PRINT A LIST
   REPEAT (40 - (CHARS_IN :L) / 2) [TYPE CHAR 32]
   PR :L
END

TO SPACE :N ;EXECUTE N LINEFEEDS
   REPEAT :N [PR CHAR 13]
END

TO EMITS :N :C ;TYPE :N CHARACTERS :C
   REPEAT :N [TYPE CHAR :C]
END

TO TITLE ;SET UP A SCREEN
   CLEARTEXT
   CENTER [* CO - OP COST ANALYSIS *]
   SPACE 2
END

TO NUM :LL :HL ;INPUT AND RETURN A NUMBER BETWEEN LIMI
TS
   MAKE "N READQUOTE + 0
   IF (AND (NUMBERP :N) (:N >= :LL) (:N <= :HL)) [OUTP
UT :N]
   TYPE [Please try again :] NUM :LL :HL
END

TO TAIL :N :L ;OUTPUT THE LAST :N ITEMS IN :L
   IF ((COUNT :L) <= :N) [OUTPUT :L]
   TAIL :N BUTFIRST :L
END

TO OF :N
   OUTPUT ((:N - 1) * 3 + 6)
END

TO $ :N
   MAKE "IP TIL :N ".
   MAKE "DP :N - :IP
   IF (:DP = 0) [OUTPUT (WORD "$ WORD :IP ".00)]
   MAKE "DP INT (:DP * 100 + 0.5)
   IF (COUNT :DP < 2) [MAKE "DP WORD "0 :DP]
   OUTPUT WORD "$ WORD :IP WORD ". :DP
END

TO TIL :N :C
   IF (NOT MEMBERP :C :N) [OUTPUT :N]
   IF (LAST :N = :C) [OUTPUT BUTLAST :N]
   TIL BUTLAST :N :C
END
```

$tring $ort

This fast binary search-and-insert routine will help keep your data in order

By JOHN N. WOLSLEGEL

Many applications programs need to sort data, and sophisticated programmers have created excellent machine language routines that perform this task very well. As a Basic programmer, however, I wanted a routine that *I* could understand and that would do the job quickly.

Most Basic sort routines employ some version of the "bubble sort" algorithm. Bubble sorts tend to be very slow—the crudest variety making N passes, each of N − 1 comparisons, to sort a list of N items. Most require that all items be entered before the sort begins, then make the user sit and wait for the results.

In contrast, the program that follows, $tring$ort, uses a binary search method of inserting new items into an already sorted listing. Because items are correctly placed as they are entered, the sort is finished when all entries have been made. And because the binary search method is very efficient, you seldom have to wait while an entry is placed. In fact, only 16 compares would be required to place an item in a list of 32,767 entries!

As the name of the program implies, strings are used to store the data you enter, and string comparisons direct the search. Both alphabetic and numeric entries (or combinations) can be sorted together in the same list. As a matter of fact, any character or combination of characters will be accepted and sorted.

When comparing strings, Basic assigns the leftmost characters the highest priority; other characters are assigned descending priorities in order. The character-by-character comparisons are performed automatically, according to the ATASCII codes of characters in corresponding positions. The result is to place entries in ascending ATASCII order.

Thus, items beginning with control characters, numerals, and certain punctuation will appear first in the sorted list; those beginning with capital letters second; lowercase letters third, etc., in the same order in which these characters appear in the ATASCII table. Check your Basic Reference Manual for the complete ATASCII character listing, so you know what you are going to get.

How It Works

Each entry occupies a same-length section of S$, dimensioned in line 10 to accommodate 200 entries. The maxi-

```
10 DIM S$(4000),SCRL$(3)
19 REM **L IS LENGTH OF SINGLE ITEM**
20 L=20:LN=L-1:DIM I$(L),NUMB$(L),BLNK$(L)
30 NH=3981:HI=4001
40 OPEN #1,4,0,"K:"
49 REM **PRINTING SCRL$ ERASES 3 LINES OF TEXT**
50 SCRL$=CHR$(156):SCRL$(2)=SCRL$:SCRL$(3)=SCRL$
60 BLNK$=" ":BLNK$(L)=BLNK$:BLNK$(2)=BLNK$
69 REM **CLEAR THE MAIN STORAGE STRING**
70 S$=" ":S$(4000)=S$:S$(2)=S$
79 REM **SET "ITEMS ENTERED" TO ZERO**
80 NE=0
89 REM **SET UP MAIN SCREEN**
90 GOSUB 1000
100 POSITION 2,5:PRINT "ITEMS ENTERED:"
110 PRINT :PRINT
120 PRINT "TYPE ITEM, AND PRESS <RETURN>.":PRINT
130 PRINT "<RETURN> TO PRINT OR DISPLAY ITEMS."
140 POSITION 17,5:PRINT NE
150 POSITION LEN(STR$(NE+1))+9,14
160 PRINT "--------------------"
169 REM **INPUT AN ITEM**
170 POSITION 2,13:PRINT "ITEM #";NE+1;:INPUT I$
180 POSITION 2,13:PRINT SCRL$
190 IF I$="" THEN 450
199 REM **USE TRAP,VAL TO SEE IF ITEM IS A NUMBER**
200 TRAP 240:N=VAL(I$):NUMB$=STR$(N)
209 REM **DETERMINE # DIGITS BEFORE DECIMAL POINT**
210 DBDP=INT(CLOG(N+1.0E-03))+1:IF DBDP<0 THEN DBDP=0
220 I$=" ":I$(L)=I$:I$(2)=I$
229 REM **JUSTIFY NUMBER TO DECIMAL POINT**
230 I$(10-DBDP-(NUMB$(1,1)="0"))=NUMB$
240 TRAP 40000
249 REM **PAD ITEM WITH BLANKS TO LENGTH 20**
250 IF LEN(I$)<L THEN I$(LEN(I$)+1)=BLNK$
256 REM ******************
257 REM BINARY SORT BEGINS
258 REM ******************
```

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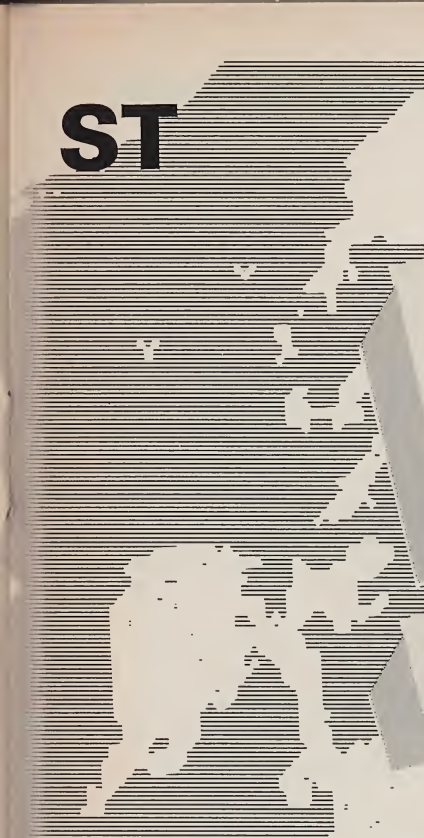

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```
259 REM **IF NO ENTRIES, JUST INSERT ITEM**
260 IF NE=0 THEN S$(NH,NH+LN)=I$:GOTO 400
269 REM **SET PTRS TO HIGHEST AND LOWEST ITEMS**
270 TP=1:BP=NE
279 REM **IF ITEM>HIGHEST ITEM, INSERT ABOVE**
280 IF I$>S$(HI-TP*L) THEN 350
289 REM **IF ITEM<LOWEST ITEM, INSERT BELOW**
290 IF I$<S$(HI-BP*L) THEN 370
299 REM **IF ITEM=HIGHEST OR LOWEST, WARN USER**
300 IF I$=S$(HI-TP*L,HI-TP*L+LN) OR I$=S$(HI-BP*L,HI-B
P*L+LN) THEN 410
309 REM **IF LOWEST-HIGHEST=1, SEARCH IS OVER**
310 IF BP-TP=1 THEN 380
319 REM **SET POINTER TO "HALF-WAY POINT"**
320 HP=INT((TP+BP)/2)
329 REM **IF ITEM>HW, SET LOW POINTER TO HW**
330 IF I$>S$(HI-HP*L) THEN BP=HP:GOTO 300
339 REM **ELSE SET HIGH POINTER TO HW AND REPEAT**
340 TP=HP:GOTO 300
349 REM **INSERT ITEM AT HIGH END**
350 S$(NH-NE*L-1)=S$(HI-NE*L-1)
360 S$(NH)=I$:GOTO 400
369 REM **INSERT ITEM AT LOW END**
370 S$(NH-NE*L,HI-NE*L-1)=I$:GOTO 400
379 REM **INSERT ITEM IN MIDDLE**
380 S$(NH-NE*L,HI-BP*L-1)=S$(HI-NE*L,HI-BP*L+LN)
390 S$(HI-BP*L,HI-BP*L+LN)=I$
399 REM **INCREMENT ITEMS ENTERED, GO BACK**
400 NE=NE+1:GOTO 140
409 REM **WARN USER OF DUPLICATE ENTRY**
410 PRINT CHR$(253)
420 POSITION 8,20:PRINT "WARNING! DUPLICATE ITEM!"
430 FOR D=1 TO 500:NEXT D:POSITION 2,20:PRINT SCRL$
440 GOTO 140
449 REM **PRINT AND DISPLAY ROUTINE**
450 GOSUB 1000:PRINT :PRINT
460 PRINT "PRESS <P> TO PRINT, OR"
470 PRINT "       <D> TO DISPLAY SORTED LIST.";
480 GET #1,K:K=K-32*(K>ASC("Z"))
490 IF K<>ASC("P") AND K<>ASC("D") THEN 480
500 PRINT :PRINT
510 PRINT "PRESS ANY KEY WHEN ";
520 IF K=ASC("P") THEN PRINT "PRINTER IS ";
530 PRINT "READY.";
540 GET #1,R
550 IF K=ASC("D") THEN PRINT :PRINT :GOTO 570
560 LPRINT :LPRINT
570 FOR I=HI-NE*L TO NH STEP 20
580 IF K=ASC("P") THEN LPRINT S$(I,I+LN):GOTO 600
590 PRINT S$(I,I+LN)
600 NEXT I:PRINT :PRINT
610 PRINT "[PRESS ANY KEY TO CONTINUE.]";
620 GET #1,R
630 GOTO 90
999 REM **PRINT TITLE**
1000 PRINT CHR$(125)
1010 POSITION 13,0:PRINT "* $TRING$ORT *"
1020 RETURN
```

mum length of each entry is denoted by variable L. I$, the length of one entry, is used to receive input. Variable NE, the number of entries currently residing in the list, is incremented each time a new entry is added.

To add a new entry, the program computes an offset halfway into S$ using the present value of NE. The new entry—stored in I$—is compared against the entry at this "half-way point." By this comparison, the program determines if the new entry should go in the *lower* or the *upper* half of the list. Depending on the answer, either the lower or the upper half is then divided in two, and the new entry compared against an entry at the dividing line. The process is repeated—each time removing half the remaining data from consideration—until only one item is left. The new entry is then slotted in above or below that item.

To add a new entry, the program computes an offset halfway into S$ using the present value of NE.

When $tring$ort finds the proper spot for I$, a string-slicing expression is used to create space for it in S$. Because Basic performs string manipulations at machine-language speed, the insertion occurs very quickly.

The Problem of Numbers

One difficulty I encountered in designing this program involved the sorting of numbers. In arriving at a ranking of numbers in string form, Basic ignores their magnitudes in favor of the ATASCII values of the characters they contain. Thus 50 sorts higher than 120, because the character 5 has a higher ATASCII code value than the character 1. A decimal point can further complicate matters. Because the "." (with ATASCII code 46) ranks higher than any character, the decimal fraction .0025 sorts higher than the number 2100, all other things being equal.

The solution is to pad numeric entries with spaces (ATASCII 32) so that all decimal points line up. The sort then functions properly in terms of both numeric magnitude and ATASCII ordering. The space-padding is time-consuming, however, and requires you to fix the decimal point position for all entries in advance.

Some Useful Enhancements

$tring$ort is presented as a standalone sorting demonstration. Its greatest value, however, might be as part of a larger application. It would be a simple matter, for example, to write a routine to save S$ to disk and retrieve it, when necessary, to add more data. If you do this, remember to store NE—the number of entries—and L—the length of each entry—as well. A routine might also be added to allow deletion or correction of existing entries. If you do so, remember that if an entry is altered, it may have to be re-sorted as well. ■

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Atari SH204 20-Megabyte Hard Disk Drive

Atari's new hard disk offers high performance at low cost

By ADAM STEPHENSON

Housed in a gray box 3.1″ high by 7″ wide and 15″ deep, the pristine featurelessness of the SH204 hard disk drive is broken in front only by a red busy light and model ID, in back by DMA and power sockets, a fuse receptacle, and an on/off switch. To coin a litotes, Atari's latest ST peripheral is no beauty queen.

But the specs are impressive: 600 tracks per inch, 5 megabit per second data transfer rate (equating to about 600,000 characters per second, in bursts), 20-megabyte formatted capacity. And because Atari has opted for assembling the SH204 out of proven OEM components (plus their own custom controller circuitry), these specs translate to high performance, reliability, and serviceability.

Installation

The compact SH204 comes packed in a large carton, surrounded by a lightweight, foam exoskeleton that guards against shock damage in transit. Though hard disks are, as a rule, notoriously vulnerable to shocks, the SH204 is an unusually robust specimen, even without this protection. In the course of the evaluation process, our production unit, protected by no more than a bright yellow tote bag, survived a coast-to-coast flight and several subway rides. It continues to work flawlessly.

Getting the SH204 connected is no harder than hooking up a floppy drive. Just attach it to the ST hard disk port with the cable provided, screwing in the plug connectors at either end; connect the power cord and plug it in; and turn the unit on. The drive motor whirs, the read/write head makes a few noises, and in about ten seconds, the busy light goes out, and you're ready to go.

The one minor problem in setting up is a by-product of the high data-transfer rates the SH204 provides: the cable connecting the hard disk to your ST can be no more than 18″ long, and the cable provided is shorter still. This may force you to rearrange your workspace somewhat when adding an SH204 to your system. However, the metal construction of the drive works to your advantage here, making the SH204 an ideal monitor stand. Alternatively, you can buy a longer cable from Atari.

Formatting the drive and configuring it to work with your system is also easy. Supplied with the unit is a single-sided disk containing programs to boot the drive handler, format and partition the drive, and park the heads prior to shipping. The installation procedure is extremely straightforward, and should pose no problems for even novice users.

You begin by connecting and turning on the hard drive as described above. Next, you place the boot disk in drive A and power up the system. The hard disk handler, AHDI.PRG, is loaded from the boot disk |AUTO| folder. A standard GEM desktop appears, in low resolution, with device icons A, B, and C—for the hard drive.

You then open drive A and run HDX.PRG—the formatting and partitioning program—from the boot disk. The formatting operation takes about a minute—remarkably fast considering the capacity of the drive.

Partitioning

The next step is partitioning: subdividing the storage space of the SH204 into easier-to-manage "logical drives," each subsuming from 4 to 16 megabytes. A menu of eight such partitioning options is offered, ranging from four partitions of 5 megabytes each, to two partitions: one containing 4, one 16 megabytes of space. Further partitioning

schemes can be custom-designed from a special window, the only restrictions being that at least one logical drive must be designated, and that no logical drive can contain less than 1 or more than 16 megabytes.

The full 20 megabytes need not be allocated to logical drives in your partitioning scheme. However, it is wise to think carefully on this matter when installing the drive, because subsequent repartitioning causes loss of all files.

Once the SH204 is formatted and partitioned, you quit HDX.PRG and return to the GEM desktop. The drive C icon is still the only extra item present; to bring up icons for the additional logical drives in your partitioning scheme, you must install them using the INSTALL DISK DRIVE function in the GEM OPTIONS menu. The manual describes this procedure in detail, but fails to mention that if your partitioning scheme contains more than three logical drives (C, D, E, and F, for example) some of the drive icons will, as you install them, cover others already on the low-resolution desktop. Naturally, the drive icons can be rearranged with the mouse as they appear, providing room as needed.

If you prefer a medium-resolution desktop, it appears necessary to make the switch (via PREFERENCES) *before* attempting to install the additional logical drives. If you don't, the additional drive icons disappear, and you have to go through the installation procedure again before saving the desktop.

When the drive icons have been installed, clicking on SAVE DESKTOP saves the current configuration to drive C, the first volume of the hard drive. Thereafter, you boot the system from a disk containing an | AUTO| folder with AHDI.PRG (the hard disk driver) in it. After the initial boot, the system will seek out DESKTOP.INF on drive C and bring up your GEM desktop with all the appropriate drive icons in place. Desk accessories (if present) will also be loaded from drive C.

The software currently shipping with the drive does not let you boot the system directly from the SH204. However, we were permitted to experiment with an as-yet-unreleased hard disk autoboot program and can report reliable performance. This software is expected to be available shortly, for a nominal fee.

Using the SH204

Once the hard disk is installed, using it is no more difficult than accessing additional floppy drives. All the GEM software we tested recognized the additional drives without a hitch. The performance improvement, however, is nothing short of remarkable. Launching *1st Word* by double-clicking on a 20K document file took six seconds with the SH204, 20 seconds without. The review you are reading took two seconds to save and load.

Disk access through ST Basic is improved considerably, as are compilation and linking of C programs when all the relevant files are on the SH204. Neil Harris, Atari's director of publications and sysop of Ataribase, Atari's own multiline BBS system, reports similarly impressive performance using the SH204 as a file server for the bulletin board.

The only difficulty a new user might experience with the SH204 is in managing the capacity of the drive. Even with judicious partitioning, it is difficult to keep track of the hundreds of files that may accumulate. For this reason, it is necessary to master the GEM path structure and make judicious use of folders and subfolders to group related items together and keep things in hand. Users will also have to accustom themselves to backing up the hard disk to floppies on a periodic basis.

Because even the smallest drive partition exceeds the capacity of even a double-sided floppy drive, this can become tedious. Atari intends to provide a utility in the near future that should simplify the backup process.

Summary

The SH hard disk manual is well-written, and leads the new user carefully through procedures for installing and operating the drive. A good deal of highly technical information about the drive controller command structure is included for those who intend to program the controller for special applications. The only complaint one could have—and it is minor—is that both the manual and hard disk management software make mention of a phantom SH104 10-megabyte drive as well. This "younger brother" model will probably never be produced. Such economies have been achieved with the SH204 that Atari sees no reason to offer consumers half the capacity of the 204 for what would ultimately be a trivial cost saving.

Our overall impression of the SH204 20-megabyte hard disk drive is that it is a well-built, solidly designed, hardware/software system. Easy to use and, at $799.95, relatively inexpensive, it expands the capacity and performance of the Atari ST to meet or exceed the demands of even the most grueling professional applications. Be warned, however—don't even play with an SH204 unless you intend to buy one. A few hours with this drive can spoil your appreciation of floppies forever. ■

The SH204 expands the capacity and performance of the Atari ST to meet or exceed the demands of even the most grueling professional applications.

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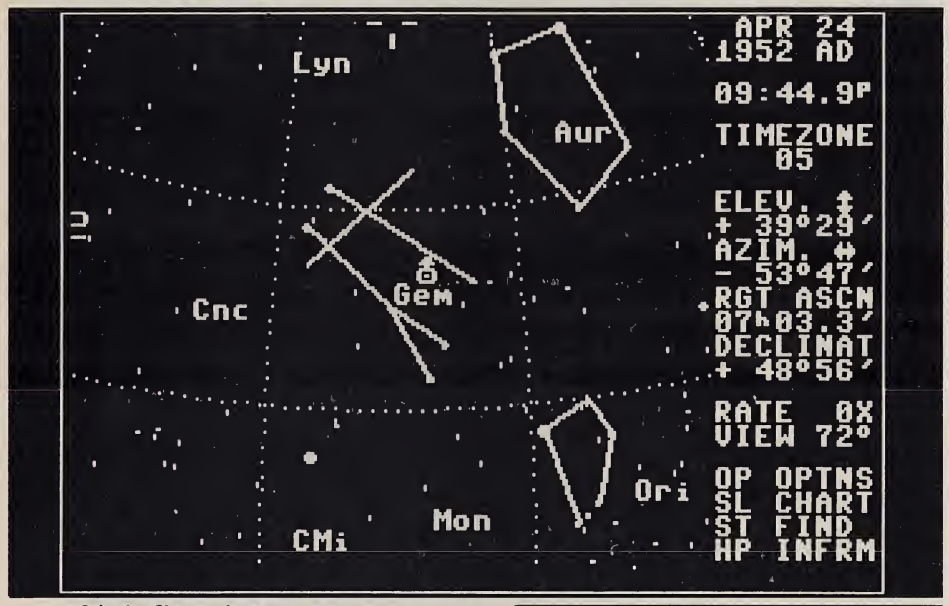
Atari Planetarium

I was one of the only people I know who didn't have comet fever this year. I was also one of two people I know who got a really good look at Halley's Comet under optimal conditions; I just happened to be in the right place (New Zealand) at the right time (March 23, 1986).

Until that time, the stars had held very little fascination for me; I was content to glance skyward occasionally and recognize a few of the more obvious constellations. But the eeriness of the Comet and the unfamiliarity of the southern sky changed all that. I began to wonder about the stars.

So it was with the zeal of a new convert that I approached *Atari Planetarium*. And it is with the appreciation of an amateur astronomer that I put the package aside so I can write about it.

Essentially, *Atari Planetarium* is just that, a planetarium that fits in your computer. With it, you can do most of the things you could do if you were the master of a real planetarium. Because you can view the sky from any point on the surface of the Earth at almost any moment past or future, you can recreate and display astronomical events like eclipses and planetary transits, or you can simply study the stars as they appear in your area and learn their names and other interesting facts about them.



Selecting Chart mode allows you to print out a copy of the screen in black on white. Most of your observations are done in Map mode, which in white on black, more closely approximates reality.

System and price: Atari 65XE, 130XE, and 800XL; $24.95

Summary: Outstanding educational astronomy program.

Manufacturer:
Atari Corp.
P.O. Box 3427
Sunnyvale, CA 94088
(408) 745-2000

By BETSY STAPLES

Using the Program

During a typical session with *Atari Planetarium*, you might decide to have a look at the heavens the way they appeared the night you were born. You would begin by choosing the Map screen mode, placing the cursor over the location of that auspicious event, and setting the date and exact time of day at which it occurred. A change to Sky mode would soon display the position of the stars, planets, and other celestial objects as they appeared on your birthday.

If you wanted to check the position of your favorite planet or constellation, you could use the Start key to zero in on it and its environs. If there were bodies on the screen that you didn't recognize, you could use the Help function to identify them. Then, to preserve the display for future reference, you could switch to Chart mode—black on white—turn on your printer, and make a copy.

If, however, like the vast majority of us, you were born at an astronomically ordinary moment, you might find it a bit more interesting to view an eclipse in progress. The easiest way to do this is to follow the step-by-step instructions given in the Owner's Manual for viewing a solar eclipse either from Athens in 431 B.C. or from the island of Tristan da Cunha in 1992.

As the eclipse progresses, the background color of the screen changes somewhat unconvincingly, serving mostly to remind you that if this had been an actual eclipse, the sky would have darkened and then become light again. By changing the rate at which time passes in the program, you can view the entire phenomenon in a relatively short period.

"For an enjoyable evening of stargazing," suggests the Manual, "set up your Atari computer on a patio table, and explore the sky, using your computer as a guide." You can orient the screen display to correspond to the direction the computer faces and begin to familiarize yourself with the part of the night sky you probably see most often.

Simplified line diagrams are available to help you locate the principal constellations and orient yourself in the sky. Abbreviated names also appear on the screen alongside the constellations,

Atari Planetarium *is a planetarium that fits in your computer.*

and standard symbols are used to identify the planets.

Other useful and interesting options include Deep Sky, which allows you essentially to zoom in on distant nebulae and galaxies, and Track, which can be used to record over a period of time individual right ascension and declination values for two celestial objects, such as a planet and the moon, to determine their closest approach.

Amazingly, all of the above mentioned functions can be accomplished easily with just a few keystrokes. Most of the functions either toggle on and off or cycle through a series of choices, so you have only to press Return when your choice appears on screen. The Owner's Manual includes a handy Command Key Table, but by the time you finish your first session with the program, you will be completely comfortable with the command keys and their functions.

Documentation

The Owner's Manual for *Atari Planetarium* is, perhaps, the most impressive part of a very impressive package. In addition to describing clearly and accurately how to use the program, the 115-page spiral-bound book offers a fascinating introduction to astronomy, complete with examples you can study with the program.

From the Great Pyramid at Giza (2800–2600 B.C.) to the Norman invasion of Britain to the appearance of Halley's Comet in 1986 to the plaque on Pioneer 10, the manual explains the importance of astronomy from antiquity to the present and beyond. It also explains such astronomical phenomena as planetary transits, alignments, and occultations—all in a style that is easy to read and understand.

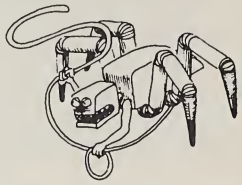
The illustrations are well labeled and helpful, and most of the example exercises are accompanied by good quality screen prints which, among other things, let you verify your settings if you have trouble getting the desired display.

Just reading the documentation for this program is educational; reading it and using it as a springboard for further exploration and experimentation could get you started on a whole new hobby or career.

All in all, *Atari Planetarium* is a well crafted package that ranks several steps above most of the educational software on the market today. Outstanding documentation and an excellent user interface combine with a fascinating program to create a product that will provide many hours of education and entertainment. ■

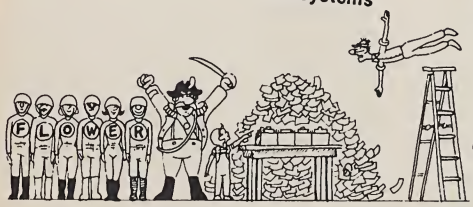
Katie and the Computer Parade

For the youngsters on your gift list, two marvelous books introduce computer concepts in a delightful way.



"Children might not suspect at first there's a method to all this madness—a lesson about how computers work. It does its job well."
The Charlotte Observer

"...the book is both entertaining and educational."
Infosystems



Two widely acclaimed books, *Katie and the Computer* and *Computer Parade*, explain fundamental computer concepts with delightful stories by Fred D'Ignazio and beautiful full-color illustrations by Stan Gilliam.

In the first book, Katie "falls" into the imaginary land of Cybernia inside her Daddy's home computer. She meets the Software Colonel, a group of flower bytes, the Table Manager, and some nasty program bugs. Basically, her journey parallels a simple command through the actual stages of processing.

In *Computer Parade*, Katie again meets the Software Colonel, this time in a festive holiday atmosphere where they encounter a variety of characters responsible for making sounds and graphics.

Children aged 4 to 10 will enjoy hearing the stories and reading the books themselves. More than just entertaining and absorbing, the books are educational and informative.

"Towards a higher goal, the book teaches the rewards of absorbing the carefully-written word and anticipating the next page with enthusiasm..."
The Leader

"Lively cartoon characters guide readers through the inner chamber of the computer."
School Library Journal

Each book is large format, hard cover, 44 pages, full color throughout. The original price for the set of two books was $14.90. However, we are now able to offer the set for just $6.00 plus $1.50 postage and handling. Payment in advance please; no credit cards, no bills, no C.O.D.s.

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When traditional graphic artists are first exposed to computer graphics, they are impressed—like most of us—by the variety of artistic "tools" an electronic paint system puts at their disposal. For a while, they marvel at the novelty of drafting geometric forms without straight edge or compass, pattern filling, and "cut and paste" image editing. Over time, however, what most often strikes them as the significant difference between the computer and traditional media is more fundamental: the computer lets them work directly with emitted light. While paper and ink, paint and canvas merely reflect the light that falls on them, the image on a computer screen literally glows.

Some artists feel this capacity threatening, for it renders large portions of their hard-won knowledge obsolete. Others, like artist/programmer William Kokoni, find working with the medium of light both challenging and liberating. "The power and affordability of the Atari ST computers," says Bill, "allow an entry-level involvement in the world of computer graphics.

"It is now possible to create representational images on a microcomputer with a good degree of realism, although achieving this with 16 shades or colors and a 320 × 200 screen resolution forces one to understand more about what he or she is doing than might be necessary when working with, say, canvas and paint. Paradoxically, the power and flexibility of the ST as a graphics tool, can be used to smooth the road to this understanding. Though the work can, at times, be tedious and confusing, when you are successful with computer graphics, the results have an impact unlike those of any other medium."

In the next few pages, Bill shares some of the techniques he used in creating "Morning Star" (opposite). By following along, you will gain practical skills you can use in creating your own works of computer art. "Morning Star" was created on the ST using Tom Hudson's *DEGAS* from Batteries Included. For the most part, however, you can apply Bill's techniques and approaches equally well using most of the paint programs designed for the ST or an Atari home computer.—**Ed.**

Paint along with Degas and Artist/Atariphile Bill Kokoni

Morning Star

The Light Palette

After booting *DEGAS*, the first thing I do when starting a new picture is to set the range of colors I expect to use, even though I may change them as the picture progresses.

If I am undecided on the actual colors, I set up a graduated scale of greys to do initial modeling and shading. Later, I can add chroma to the resulting black and white picture by resetting the palette and using "fill" options.

By WILLIAM KOKONI

One of the advantages of working with the computer is that your picture is dynamically associated with your palette. This means that if you select a color, paint with it, then go back and remix that color on the palette, the area you originally painted will change color, as if by magic, to match the new shade. This can be very useful—and fun to

experiment with. For example, you can paint a landscape, then pump up the highlights or tone down the shadows with a few clicks of the mouse until you get it right—or even change a summer scene to fall by going from greens to reds. But changes of this sort can just as easily confuse your color scheme unless your palette is carefully planned.

In setting the palette, you find that there is an inherent tradeoff between the number of colors you can use in a painting and the resolution or level of detail you can put into your work. A computer picture is made up of little dots (*pixels*, or picture elements) of color, and the computer video hardware can provide either lots of dots (meaning more detail) or lots of colors, but not both. The ST, for example, lets you work with a palette of 16 colors when you are painting in low resolution (320 × 200 pixels), four colors in medium resolution (640 × 200 pixels), and two colors (black and white) on the high-resolution (640 × 400 pixels) monitor.

Once you choose a particular resolution, you are stuck with its limitations. Good palette planning, however, can help you maximize the impression of detail in lo-res or the impression of multiple colors or levels of shading in medium- and hi-res. In the first case, outlining forms with multiple intensities of a single color can help smooth out the jagged appearance of their edges. In the latter case, defining chromatic "halftones"—complex patterns of dots in two or more colors that work as intermediate shades—can broaden a too-

Artist/programmers find working with the medium of light both challenging and liberating.

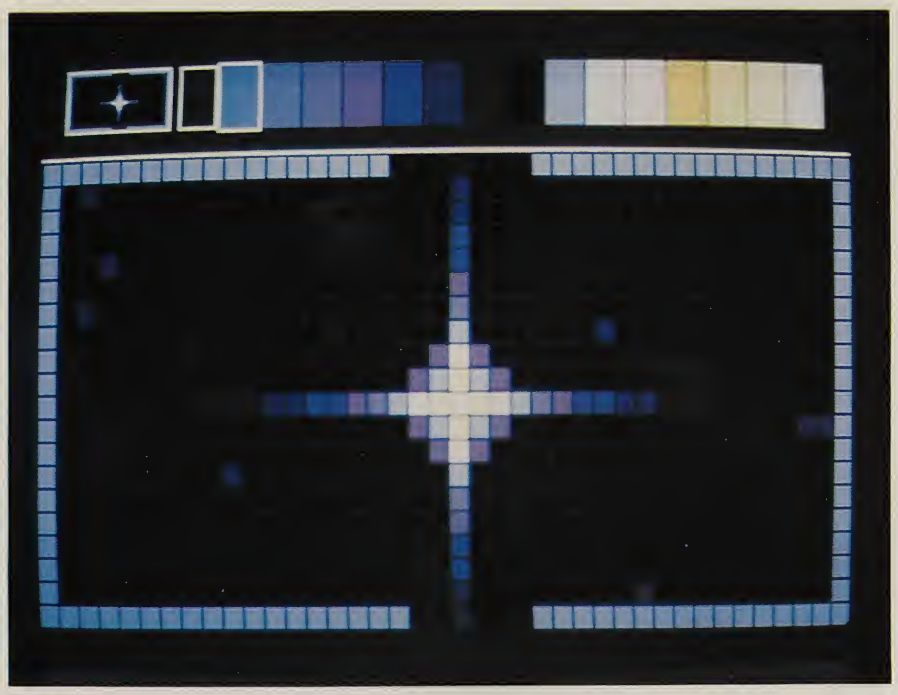


Figure 1.

Table 1. Palette for Morning Star

Color
1—0,0,1 This is the border color.
2—3,0,7 Planet atmosphere (disc 8)
3—3,0,6 Planet atmosphere (disc 7)
4—3,0,5 Planet atmosphere (disc 6) and stars
5—3,0,4 Planet atmosphere (disc 5) and stars
6—2,0,3 Planet atmosphere (disc 4) and stars
7—1,0,2 Planet atmosphere (disc 3) and stars
8—0,0,1 Planet atmosphere (discs 2 & 1) and most distant body of stars.
9—0,0,0 Deep space background and disc 9 (planet silhouette)
10—4,3,7 Atmospheric flare (7th ring) and star points.
11—6,6,7 Atmospheric flare (6th ring)
12—7,6,7 Atmospheric flare (5th ring)
13—7,6,3 Atmospheric flare (4th ring)
14—7,7,4 Atmospheric flare (3rd ring) and star points
15—7,7,5 Atmospheric flare (2nd ring)
16—7,7,7 Central core of atmospheric flare and center of larger stars

narrow palette. Anticipating the use of such techniques lets you plan your palette. The other key to good palette planning is an understanding of how color mixing works on the computer.

Light Mixing

Mixing colors on the computer is a matter of combining various proportions of red, green, and blue light—the so-called "additive primaries." For example, producing the color white on the screen is simply a matter of turning red, green, and blue up full—creating an equal mixture of the three wavelengths at highest intensity. Because grey is, in a sense, a "lesser" shade of white, we can set up a grey tone by creating an equal mixture of red, green, and blue at lesser intensity.

Black—the absence of visible light—is produced by turning off all three colors. Mixing two of the colors (in the absence of the third) creates: with green and blue, the range of cyans and aquas; with red and blue, the range of magentas and violets; and with red and green, the range of yellows, olives, and browns. After some experimentation you will quickly get the hang of it.

To set up a palette in *DEGAS*, you click on the SET COLORS box in the options menu. The window that appears displays three columns of eight small boxes that work like slider switches. The settings of these switches control the "mix" of red, green, and blue in each color you select from the palette strip above. The first and last colors in the palette are used by the *DEGAS* menu screen—you must keep a contrast between these two colors in order to have a legible menu (Color 1 is also the border color in the picture screen).

"Morning Star" was done in the low-resolution mode, so 16 colors were available. I set the palette as shown in Table 1. The group of three numbers for each color describes the settings of red, green, and blue for each color on the *DEGAS* scale of 0 (lowest intensity) to 7 (highest intensity). Initially, a range of blues and tinted whites was set. These were adjusted as the picture progressed. The intended use of each color is indicated.

Starting to Paint. . .But First. . .

Before starting any serious drawing on the computer, I make sure to have handy a few blank, formatted disks on which to save work at various stages under different filenames. This lets me backtrack if I don't like the way a picture is evolving. By saving work periodically, I can experiment freely without the risk of ruining my work. Frequent saving also lets me compile libraries of backgrounds, figures, and objects that can be modified and adapted to new work.

I started "Morning Star" by blocking in the "deep space" background color using the box feature, a solid color fill, and Color 9 (black). The effect I ultimately wanted to achieve was that of the large mass of a planet, silhouetted by the glowing halo of its atmosphere, illuminated by the rays of a star or "sun" breaking over the horizon. The glowing halo of ether had to be thin and transparent at the outer fringes and brightly translucent near the planet surface where the atmosphere was denser.

To create the effect of light passing through an atmosphere of graduated density, I conceived an arc composed of graduated shades of blue, darker toward the outside and growing lighter toward the center. The DISC function let me draw these arcs as concentric quarter-circles of color, using the lower right-hand corner of the screen as a starting point. The largest quarter-circle was drawn in Color 8, the others in Colors 7, 6, 5, etc.

The planet silhouette—the central quarter-circle, and the only one shown fully—was eventually laid down in similar fashion using Color 9 (black). Ini-

tially, I plotted only the outermost two disks (the most transparent ones) in anticipation of adding the stars and having them overlap the disks to further emphasize the transparency of the outer atmosphere.

Drawing the Stars

Instead of plotting individual points to create the body of stars, I used the AIRBRUSH. Using the SET AIRBRUSH option, I set AIRBRUSH SIZE to large, because I planned to cover a fairly sizeable area with stars. I set AIRBRUSH FLOW to low, giving me fine control so that I could build up more densely starred areas with several airbrush passes. Before laying down the stars, I saved what I had already painted, because I realized I might need several tries to get the stars just right. In general, it is a good idea to save a picture before using any function that is inherently hard to control (like the airbrush) or will have a "global" effect that is hard to undo (like filling a large area with a very definite pattern).

Moving the airbrush cursor in a circular motion around the left-hand side of the screen—in what would be deep space—I tried to create a convincing representation of small stars. I ran over the edges of the discs a little to create the "show-through" effect described above. If you ever do airbrush work like this, my best advice would be not to overdo it. Build up denser areas with several passes, rather than holding the airbrush with button depressed too long in a single location. Keep it moving.

To create a sense of void and distance, making the stars seem to hang in different planes of space, I repeated the airbrush process five times—each time plotting fewer stars in progressively lighter shades of blue. Colors 8 and 7 were used to create the majority of stars. A few quick passes of Colors 6, 5, and 4 stood for the brighter or nearer stars. When I had finished the stars, I went ahead and completed the remaining 7 planet discs, as described above.

The Larger Stars

To create the larger, "actinic" stars (those with points), I used the *DEGAS* MAGNIFY mode, which enlarges a small section of the screen and lets you work on it pixel-by-pixel. Figure 1 shows the way I colored each pixel in drawing the largest of these stars. Note that pixels become progressively darker in shade as they move outward from the center of the star. When this arrangement is viewed at normal size, it appears as rays of light emanating from the center of the star.

The smaller, actinic stars were built up the same way, but because they contain fewer pixels, fewer and more widely-ranged colors were used. Stray pixels plotted by the airbrush that fell within the ray boundary of each star were erased by plotting over them with Color 9 (black).

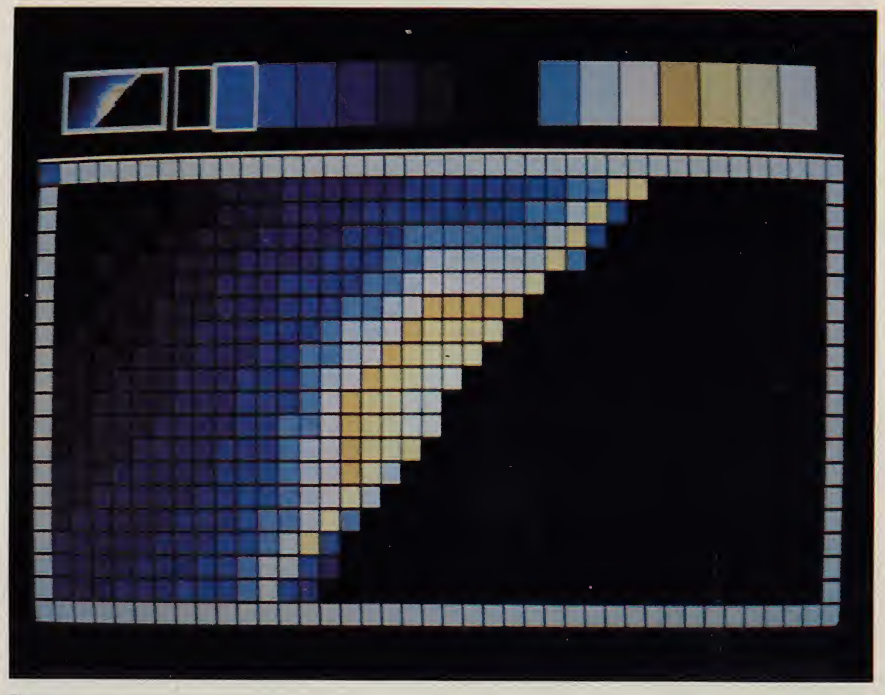


Figure 2.

The Morning Star

The morning star on the horizon of the planet was done pixel-by-pixel with progressively darker colors (Colors 10–16), for an effect similar to that used for the larger stars. The area covered by the MAGNIFY window was, however, too small to contain the whole of the morning star, so I had to build up the star in sections by "zooming in" on several overlapping areas. Figure 2, shows the color scheme I used.

Note that although this color map appears "blocky" in MAGNIFY mode, the effect of using so many slightly different colors close together fools the eye into perceiving a smooth gradation of shades when the figure is viewed at normal size. This technique can be used to increase the apparent detail in a low-resolution drawing.

Finishing Touches

I saved the completed picture, then sat back and began to experiment with aspects of the palette, watching the picture change as I worked. It is interesting, instructive, and often inspiring to experiment this way with finished paintings. Because large areas of a drawing can be color-modified instantly by altering the RGB content of the colors used to paint them, you can cycle through a large number of fundamental changes in a very short time.

Some of the more interesting variations on "Morning Star" resembled the scene as one might imagine it would appear to an alien whose eyes were sensitive to heat or to electromagnetic radiation. I saved several of these variations as starting points for future work.

Naturally, in discussing a single painting, one can't begin to demonstrate all possible techniques of painting with light. In fact, as I make the computer more and more a part of my daily life as an artist, I find each project cause for developing new technical approaches and aesthetic points of view. I hope this article inspires you to grab a mouse or joystick and begin inventing some of your own. ■

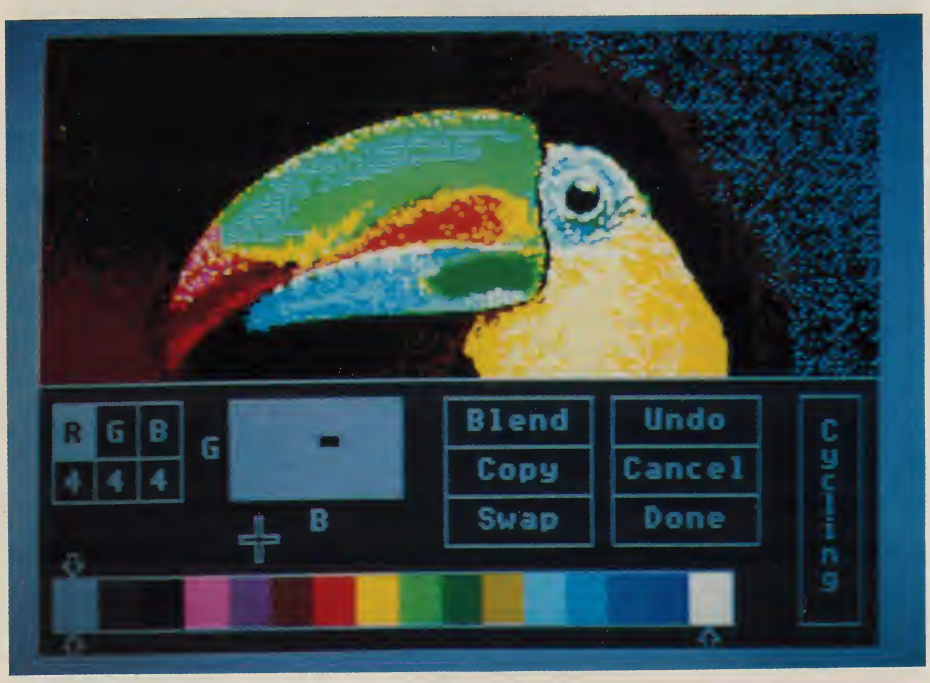
William Kokoni trained in oil painting at New York's Art Student's League. He took up programming and computer graphics five years ago after purchasing an Atari 800. Now having harnessed the affordable power of the ST, he has become one of New York's most innovative new computer graphics pioneers.

Paintworks

"*Paintworks* is more than a paint program, more than a graphics editor. *Paintworks* is designed to be an extension of the creative process." So reads the introduction to the *Paintworks* reference manual.

It sounds as if the folks at Audio Light, designers of the program, are on the right track. Graphics software can never have enough in the way of drawing and presentation features that allow users to create, perfect, and display their work easily. The power and versatility of the ST are well employed by *Paintworks*, and it offers the user an excellent set of tools for constructing images on the screen.

The program supports both the SC1224 (color) and the SM124 (monochrome) monitor, one or two floppy drives, a hard disk drive, an Epson compatible dot matrix printer, and even the resident sound chip and MIDI ports. (These last can be used to add music to "slide shows," programmed with the playback editor.)



System and Price: Atari ST; $39.95
Summary: "Must have" graphics program
Manufacturer:
Activision, Inc.
2350 Bayshore Frontage Rd.
Mountain View, CA 94043
(415) 960-0410

The User Interface

The user interface in *Paintworks* incorporates drop-down and pop-out menus, status lines, and dialog boxes to remind you what features and functions are available and which are active. The interface design deserves much praise for making *Paintworks* fast, accessible, and versatile.

The status line at the top of the screen provides a short description of the current mode of operation. A click of the mouse replaces this line with a bar of drop-down menus, including those used to control disk and printer I/O, color cycling, text styles, zoom modes, the color palette, and fill patterns. Below this, overlapping the top and bottom borders of the work area, are two horizontal strips containing the drawing option menus. These are menus that will not activate unless the mouse button is pressed with the cursor resting in the menu area.

Three Graphics Screens

The *Paintworks* drawing environment supports three drawing screens. There is a primary screen and, if your computer has TOS in ROM, you can add a second screen as well. This second screen may be treated independently or as a vertical continuation of the main screen. The latter approach results in a two-screen "page" that can be saved or printed as one picture. You can coarse-scroll up or down through your work with the slow-scroll feature.

The third screen is an editing area or clipboard where you can create figures or picture "parts" for later copying into the main work areas. This clipboard screen can be printed or saved to disk independently, allowing you to build libraries of clip art for future use.

File Compatibility

Users who have existing libraries of *Neochrome* and *Degas* files will appreciate the fact that *Paintworks* converts

By WILLIAM KOKONI

and loads both file formats to its work areas. This feature lets you enhance old material or combine previous efforts with new work.

Running out of disk space when saving the 32K ST picture files is always a problem. One solution is to compress files to save space. *Paintworks* provides this option and can also save files in uncompressed file format. Compressed files vary in size, depending on the complexity of the picture, but compression usually results in much smaller files.

Drawing Features

The drawing features of *Paintworks* are the same as those found in most other ST paint programs, but *Paintworks* sports a fuller complement of options within each feature category than most of its competitors. For example, while most paint systems offer a "magnify mode" capable of blowing up a small section of the screen for close examination, *Paintworks* offers not one but three "powers" of magnification.

Like most paint programs, *Paintworks* lets you "select," then copy, or delete a picture section by surrounding it with an elastic box and clicking on a menu function. But *Paintworks* also lets you experiment with colors inside a selected region.

A larger-than-usual selection of text styles, fill patterns, geometric border shapes, and brush shapes is supported. Color cycling lets you set up two or more palettes for a single work, then cause the computer to "cycle" through them, causing ripples of changing color to flow across your picture.

Other Features

The slide show presentation program included on the disk lets you display your works in any programmed sequence. Color cycling, fades, and repeats, among other techniques, can all be used in a presentation. Even the ST MIDI capabilities can be brought into play. Background music composed with Activision's *Music Studio* program can be incorporated freely in a presentation—even the timing of graphic and musical events can be independently controlled. Presentations are controlled by a command list you create with any ASCII text editor.

***The power** and versatility of the ST are well employed by Paintworks.*

The reference manual supplied with *Paintworks* does a good job of explaining each function and includes samples of the many ways you can combine and use the features of the program.

I can not say that the suggested retail price of this software is competitive. It is downright aggressive at $39.95. *Paintworks* is one for your "must have" list. ■

Puzzles & Problems Answers

No Change

The most common answer is four pennies plus one each of the four other coins for a total of 94 cents. However, the correct answer is four pennies, four dimes, a quarter, and a half dollar, total $1.19.

Divisible By 14.

The sum is 35392.

Likes and Dislikes

Grandma likes anything with a name containing a double letter. Thus, she will like rolls, cattle, rubber, and copper.

What Number?

The number is 47.

Fly and Mosquito

12 minutes.

Tile Floors

One room is 38 feet square (1444 tiles) and the other is 26 feet square (676 tiles).

Zilch

Sure; it would be a good deal if you could get 8000 pilches for 26 zilches. Since 1 zilch has a value of 299 pilches, 26 zilches would then be worth 7774 pilches.

Sum Cubes

The three integers are 7, 11, and 25.

Jack's Beanstalk

199 days.

TIMEKEEPER™ for Atari ST

$39.95

TIMEKEEPER™ is a plug-in battery-backed Real Time Clock Calendar for the ATARI ST Computers. The Timekeeper module plugs into the cartridge port on the ATARI 520/1040 ST Computer. A program is supplied with Timekeeper that operates as an accessory like the control panel. A feed through cartridge slot allows Timekeeper to remain installed while using other cartridges.

The Timekeeper program automatically gets the time and date from the Timekeeper modules during the power up or boot sequence. The computer's own clock is set up and the Timekeeper is then disengaged until the computer is turned on again.

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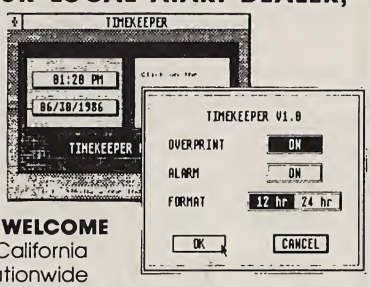

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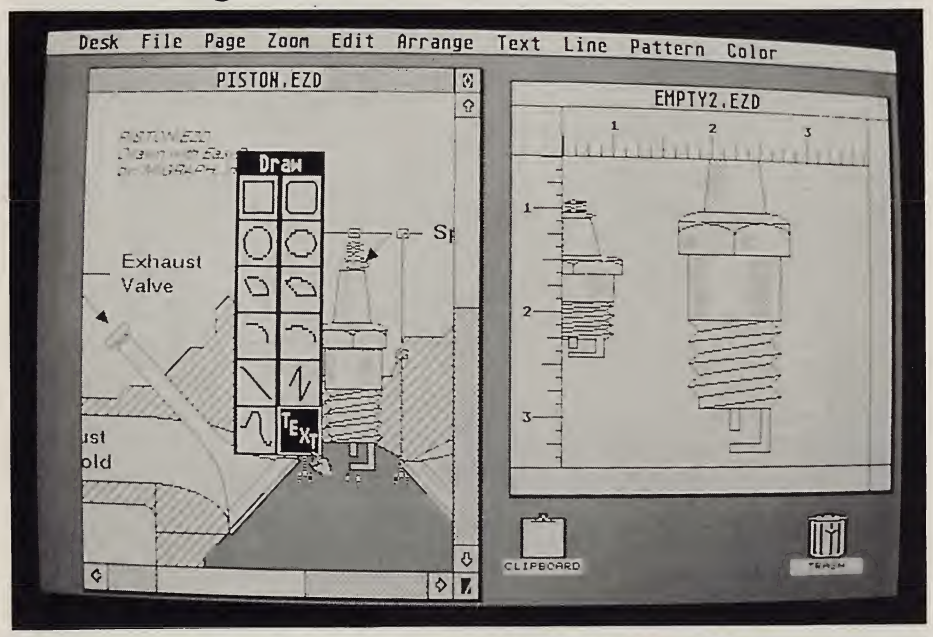
Easy-Draw



MiGraph's new drafting program points the way to a revolution in sophisticated applications software

System and Price: ST; $149.95
Summary: Sophisticated drafting system
Manufacturer:
MiGraph, Inc.
720 South 333rd St.
Suite 201
Federal Way, WA 98003
(206) 838-4677

There's an old saying: "a craftsman is only as good as his tools." Abstracted to software, the saying might be rewritten: "a program is only as versatile as the operating system it runs on." Progress in software is closely linked to progress in operating system design. Within a single generation of a particular OS, software tends to improve incrementally. When significant new facilities are added to an operating system, however, applications software tends to undergo an equally significant, though sometimes subtle, personality shift.

Such a shift is patently in evidence in MiGraph's *Easy-Draw*—a new drafting program for the ST that incorporates aspects of the GDOS (Graphics Device Operating System) enhancement to GEM. GDOS provides a powerful set of facilities for graphics input and output, plus font-handling, permitting programs to handle graphic "objects" in a far more abstract, high-level manner than was practical heretofore.

An Object Lesson

Easy-Draw stores drawings in terms of GEM ND (normalized device) coordinates and line style information. NDCs provide an extremely high-resolution matrix—higher than that of any standard output device—for maintaining images. From the NDC representation, GEM can conveniently downscale graphics to the screen or, through use of GDOS "metafiles," to any supported peripheral—accurately maintaining the proportions of an image at whatever level of detail an output device can sustain.

Largely due to GDOS, *Easy-Draw* has a definite edge in performance and potential versatility over other ST drafting systems, particularly in generating clean hardcopy. Using an Epson printer, for example, we were able to run off perfectly-proportioned images at about 144 dots per inch horizontal and 120 dpi vertical. It is possible to obtain even higher-quality output by printing images in larger sizes (resulting in increased detail), then reducing the printouts photographically to the scale desired.

The Drawing Process

Using *Easy-Draw* for the first time is very different from working with most graphics packages. Each time you finish drawing an object, it is immediately surrounded by a "figure box"—a kind of selection rectangle. The figure box shows the extent of the object and permits stretching and deforming it in any of eight directions. As you draw sections of a picture, you create, in effect, a library of graphic "building blocks" that can then be manipulated (scaled, rotated, stretched, etc.) independently of one another and combined in an infinite of ways. An interior designer might, for example, create a library of "furniture" objects, then load and scale these as needed to populate a variety of different room plans. The completed plans, themselves identified as objects, might then be combined into the floor plan of a residence.

The Drawing Environment

Easy-Draw requires TOS in ROM. The program can be used in medium resolution on the SC1224 RGB monitor, but is best on the SM124 monochrome monitor in high resolution. *Easy-Draw* offers two drawing "pages" that can be displayed or hidden via commands imbedded in standard GEM menus. Editing functions used to copy and change the size of objects (among other things) are also accessed through these control menus. Frequently-used drawing and labeling functions, however, are accessed via a control panel that pops up at the position of your cursor whenever you press the right mouse button.

Each "page" represents a virtual piece of drafting paper, 11 × 17 in., 8½ × 14 in., or 8½ × 11 in. in size, laid out vertically or horizontally, as you prefer.

By WILLIAM KOKONI

To guide your hand, a ruler or grid, scaled in increments ranging from 1/64 to 1 in., may be superimposed on your work surface or made to disappear at will. The grid can be used merely as a visual indicator, or placed in Snap mode—wherein mouse movements are automatically constrained to the grid lines. This latter feature aids conspicuously in drawing to precise scale.

A comprehensive Zoom feature lets you view and work with your drawing at a variety of levels of detail. Editing features let you delete (and undelete) objects, duplicate selected objects or object groups, rotate objects by increments of 90 degrees, shadow objects, change line styles, alter object size, stretch an object in any of eight directions, and edit labels and other text. Other features let you set object display priority (placing one object in front of, or behind another), group individual objects together as super-objects, and align objects to left, center, right, top, middle, and bottom of the drawing page. Text is available in four point sizes: 10, 14, 18, and 36, and six basic styles (which may be combined freely), and justified or left ragged. All of the GEM line styles (including arrow lines) and a variety of fill patterns are supported in *Easy-Draw*. A pattern editor and color palette are included as well.

Easy-Draw can save your work in either of two disk file formats: one with an .EZD extender (unique to *Easy-Draw*) and one with a GEM extender, required by Digital Research's Printer Output Program (included in the package). The output program, which handles scaling and printing of all documents created with *Easy-Draw*, permits horizontal or vertical printing, justification, and a number of other variations. Currently, only the Atari SMM804, Gemini 10X, and Epson (and compatible) printers are supported. Additional printer drivers are forthcoming, including drivers for popular laser printers and color dot matrix printers.

The reference manual is a neatly printed, spiral-bound affair on glossy stock, containing examples, tutorials, hints and tips on using the numerous features of the program, a reference section, and a complete index.

Versions and Revisions

At this writing, the latest version of *Easy-Draw* is V1.03. Three earlier versions, V1.00, V1.01 and V1.02, have been marketed, and registered users of these versions can upgrade to version 1.03 by returning their original disks, plus a nominal $3 handling fee.

Easy-Draw V1.03 offers a number of refinements over prior versions, including the ability to select and de-select an object "through" layers of objects, improved text handling, more memory for text, and the Gemini 10X/SMM804 printer driver.

I found *Easy-Draw* great for designing business cards, logos, letterheads, forms, floor plans, charts, graphs, etc. The $149.95 list price seems more than fair, considering the vast utility and high performance of the program. It is a harbinger of an upcoming revolution in sophisticated applications software; the payoff on Atari's commitment to enhancing the ST operating environment. ■

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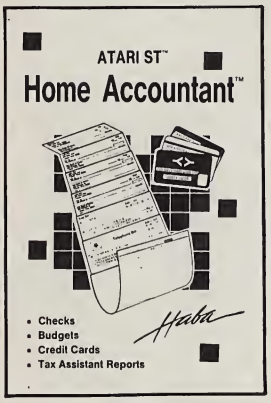

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Software Survey

Switchboard, Powerstar, NAM, Rogue, The Pawn, Super Boulderdash, and Racing Destruction Set: These short reviews will bring you up to date on some of the newest software available for both 8-bit and ST systems.

The Pawn was the first game I played on my new ST. In a way, I'm sorry it happened that way, because I now expect *everything* for the ST to be as good, and I know I will be disappointed.

When the title screen loads, it looks as though someone has glued a photograph to your monitor. Once underway, you can invoke similarly stupendous graphics at will with the right mouse button. Moving your mouse pointer to the top of the screen and dragging the pointer towards the bottom seems to pull the picture over most of the text like a window shade. There is no jerkiness to this effect, and the realism of the artwork is incredible. A friend remarked that standing across the room from the monitor gives you the impression of looking at a slide show rather than computer graphics.

Other windows can be pulled down to help you with such tasks as game saves and restarts, text size, and room descriptions. The use of function keys is also supported; programming them with commonly-used phrases gives you one-stroke text entry.

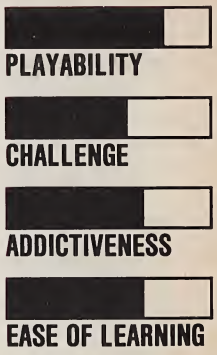
Now I was never a big fan of text adventures, because I was reluctant to invest the required time to figure out what the program did and didn't understand. That problem is less significant in

Racing Destruction Set

System and Price: 48K 800/1200/XL/XE; $14.95

Summary: Arcade-like racing game and construction set

Manufacturer: Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404
(415) 571-7171



Bill Budge's *Pinball Construction Set* was one of the first programs marketed by Electronic Arts, establishing them as leaders in the entertainment software business. More important, the package introduced a new type of program, which allows the player to tailor—even create—a game to fulfill his arcade fantasies. *Lode Runner* and *The Arcade Machine* are later examples of the genre.

Now as a new variation on the theme, Electronic Arts has introduced the *Racing Destruction Set*. As you can gather from the title, it is an automobile racing game that allows you to build race tracks to your own specifications and demonstrate your video driving prowess as you race against either the computer or a human opponent. Details like tires and vehicle type—motorcycle, lunar buggy, or Jeep, for example—can be chosen for best performance on a given track. But the thing that excites me the most about this program is the ability it offers to alter factors that cannot be changed in real life. Gravity and surrounding scenery can be varied, and even saved to disk for later contests. Even road surfaces—ice, pavement, and dirt—can be mixed and matched.

The program comes with 50 tracks that demonstrate its versatility. Some of the tracks are replicas of actual racing venues (seeing the local Lime Rock Park track brought a smile to my face). Others are simply samples of what you can create yourself.

Mastering the piece-by-piece building process is quite an ordeal at first, but before too long you will find yourself quite adept at the technique. The most difficult task is matching adjacent roadway; both height and width are critical and must match at each junction. Unfortunately, you can not save a track that has a mismatched segment or is incomplete. Trapping errors in the design stage rather than the playing stage makes it impossible to save partially-constructed courses. Imagine how frustrating it would be to spend hours building a track—especially a large one—only to be interupted by hunger, fatigue, or social obligation.

On the positive side, *Racing Destruction Set* does offer some heart-pounding excitement. The difficulty of play can be changed, so experienced drivers can flaunt their competence and novices can be forgiven for beginner's sloppiness. Another option allows you to be, shall we say, reckless? A choice of rules lets you get a little more physical with your vehicle to impair your opponent's dash

System and Price: Atari 520 or 1040ST; $44.95
Summary: Vivid graphic/text adventure game
Manufacturer: Firebird Licensees, Inc.
74 North Central Ave.
Ramsey, NJ 07446
(201) 934-7373

PLAYABILITY

CHALLENGE

ADDICTIVENESS

EASE OF LEARNING

The Pawn

The Pawn, because the parser rivals the parsers of some Infocom games. The chaining of long sentences is encouraged and quite expeditious.

Like other adventures, *The Pawn* is full of puzzles and tests for the adventurer to solve. Impatience during your quest to leave Kerovnia is not rewarded and at that point I would normally lose interest in the game. However, to keep players from despair, the creators of the program have included a way to provide hints without phone calls or tip sheets. In the manual, they provide a series of frequently asked questions; under each are a few codes that you can type in when frustration becomes unbearable. The program responds to each code with a clue, which may or may not be helpful.

The Pawn is an excellent example of what can be done with the ST. I think it is destined to become a classic.

—Andy Eddy

to the finish line. Tools of the trade include armor, land mines, and oil (to slick the road)—all at the cost of additional weight which may slow your acceleration.

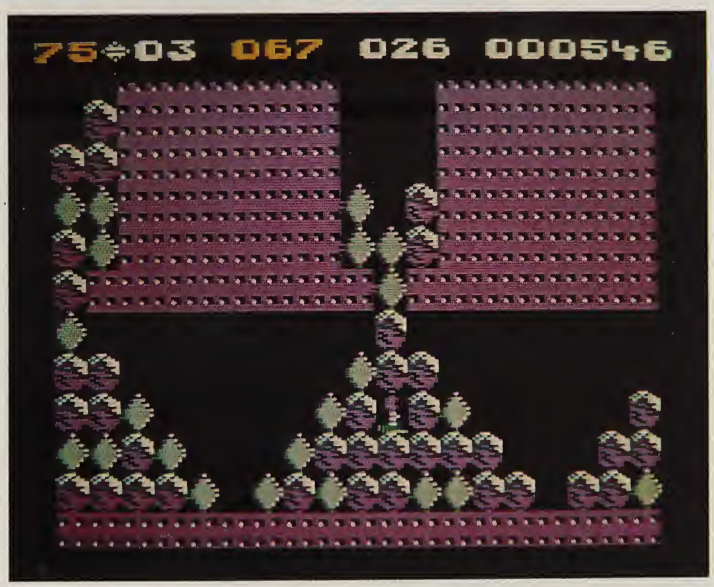
Joystick control of the vehicle could have been an unwieldy task, but the programmers kept it very simple by making the handling slot car-like. If you don't push the speed too much, the car will stay in its lane, allowing you to run a race nearly hands-off. A single tap of the joystick in one direction or the other will move the car to an adjacent lane—very easy, until you meet another vehicle battling for the same lane.

Lastly, a slightly negative note: Though not a hindrance to the gameplay, the graphics in the program are not all they could be. And I noticed a bit of jerkiness when running along a track that could induce eye-strain when staring at the screen intently. But those are only minor detractions from an otherwise outstanding package. Now, if you'll excuse me, my car is idling and I don't want to waste any gas.

—Andy Eddy

Super Boulderdash

System and Price: 48K 800/1200/XL/XE, $14.95
Summary: Challenging arcade-style adventure game
Distributor: Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404
(415) 571-7171



PLAYABILITY

CHALLENGE

ADDICTIVENESS

EASE OF LEARNING

Gather 'round everyone, it's time for a physics lesson. Our guest tonight is the world-renowned Rockwell, star of *Boulderdash*, who will explain to us how rocks and diamonds react to gravitational forces. Our beloved treasure hunter travels from cave to cave in search of gems, trying to avoid being squashed beneath avalanches of stone . . .

When First Star Software introduced *Boulderdash*, the gaming enthusiasts had a new arena in which to frolic—caves in which to dig for buried treasure while being chased by deadly fireflies, butterflies, and amoebas. The main concerns of our joystick-controlled leading man were the tumbling of boulders jarred loose by his tunneling.

Now, Electronic Arts has packaged this thriller in a two-for-one offering called *Super Boulderdash*, which combines the original contest along with an entirely new game, *Boulderdash II*. *Boulderdash II* features 16 different mazes, all far more intricate than the earlier ones. Your work is definitely cut out for you.

You could think of *Boulderdash* as an interesting cross between Pac-Man and Dig Dug. But to say that it is similar to either of these games is unfair, because the approach is novel. Strategy plays an important part in staying alive. For example, the amoeba will eat through earth and air as it spreads around the maze. If it gets too large, it will turn to rocks and most probably ruin any chance of escape you might have had. If, however, you keep your wits about you, you can use boulders to trap it. It will then suffocate and turn to diamonds. Similarly, dropping a boulder on a butterfly will cause it to explode in a shower of jewels. This sounds much easier than it actually is, because each succeeding level is more difficult, and requires a modified strategy.

In each cave you must pick up a specific number of diamonds before you can exit. A glance to the top of the display will keep you informed of score, time, and points per diamond—and once that number is reached, the screen flashes and an escape door appears. If any diamonds remain, you can either snag them for bonus points or pass them up in favor of a quick exit. Careful movement around the cave will reveal the location of the door; each escape hatch is in a different place.

This game will provide hours of engrossing action. The return of *Boulderdash* is welcome; the opportunity to buy it along with a new and equally intense contest is a real treat—***Andy Eddy***

Saigon, Phnom Penh, Khe Sahn . . . anyone who lived through the 60's heard and saw images of these cities in news reports on radio and television. Conversations that began with other subjects inevitably turned to "the war," and many of our brothers either were lost in the bloodshed or sought asylum in other lands.

With the advent of automatic weapons, speedier aircraft, and artillery of deadly precision, the Vietnam war was viewed by many historians as a costlier war in terms of lives than any of those that preceded it. *NAM*, by SSI, is an historically accurate rendition of six of the battles that occurred during the war, pitting one joystick-equipped player against the computer-controlled enemy. It gives you a taste of the tension that thickened the air of the battlefields.

The purpose of the game is to take the troops at hand (charted in the same configurations as appeared in the actual battles) and defeat the Viet Cong. The element of surprise on the enemy's side creates a great deal of frustration in your pursuit of victory. In the actual war, neither side won a clear victory; likewise, you will not have an easy time winning at *NAM*. Your strategic and organizational powers are put to the

Powerstar is a *cartridge-based*, graphic adventure that takes you into the 21st century and fills your computer with exciting images. The scenario revolves around an orbital nuclear power plant in space which is the source of all the world's energy. It seems that the one crew member entrusted with the operation of the reactor has gone a bit stir crazy. Called into action by the government as his alternate, you cut short a relaxing vacation and leap into action to save the world and the powerstar from destruction.

The problem with most graphic adventures lies in the long pauses between rooms as the program disk is accessed and new information sent to the screen. In contrast, because *Powerstar* is on cartridge, all changes in perspective are immediate. This adds to the realism, as you can look around a room in something comparable to real-time. Your movements can be controlled from the keyboard or with a joystick.

Your journey includes 63 different locations, each of which has four different views—one for each major compass direction. Add to this two more screens for inventory and explosion, and you have an amazing total of 254 different

NAM

System and Price: 48K 800/XL/XE; $39.95
Type: War simulation
Manufacturer: Strategic Simulations, Inc.
1046 N. Rengstorff Ave.
Mountain View, CA 94043
(415) 964-1353

PLAYABILITY
CHALLENGE
ADDICTIVENESS
EASE OF LEARNING

test, and very few clues are given to aid you.

You have the choice of playing the scenario as it occurred in actual battle or competing in a non-historical mode. For playing the historical mode, the manual offers hints on the strategy necessary to gain the upper hand. It describes the events that led up to the battle, and provides a synopsis of each confrontation. Knowing this allows you to get an idea of where the enemy is coming from. Playing a scenario over and over gives you practice for future skirmishes and offers a clue to the enemy's motivation in certain maneuvers.

Each of the scenarios is a different length, varying between 10 and 40 "turns." Every turn gives you the opportunity to view the layout of both sides, plot artillery fall, move your troops, and fire on the Viet Cong, as well as offering your opponent a chance to move and fire on you.

Many actual wartime nuances, including the possibility of units becoming "pinned" (unable to move) and the ability to transport certain units with trucks and helicopters, demonstrates the care with which this program was designed. SSI has done its best to simulate the actual war experience as much as possible.

The well-written manual and the simple play of the game make the game very playable—even for novices. Everything is amply described, and much is self-explanatory. Newcomers to the war simulation genre—as I was before this encounter—will probably finish the first few battles in defeat, but perserverance will soon have you enjoying much less lopsided confrontations. And, you will also learn a little about this war and its forgotten warriors—***Andy Eddy***

displays, all packed into a 16K cart.

Of course, the vocabulary of the game does not have the scope of an Infocom game, but it is large enough—over 200 words—to handle a reasonable number of synonyms.

Also, while the graphics are sufficient to give your imagination something to work with, they have a boxiness reminiscent of ancient Atari software. This is easy to tolerate if you enjoy space adventure and use the pictures simply to add an extra dimension to the contest.

On the subject of graphics, there is a group of Atari users who may have difficulty with the *Powerstar* display. Early versions of the Atari 400/800 computers were equipped with a chip called the CTIA, which was responsible for various color and graphics duties. A short time later, Atari brought out an upgraded version of this IC called the GTIA. The only problem was with software that utilized features available only to the GTIA; the CTIA was unable to translate the information properly.

Unfortunately, *Powerstar* falls into this category. Though the designers assure us that this won't hinder a CTIA-equipped computer owner from completing the game, it does cause some

quirky-looking scenes on the screen.

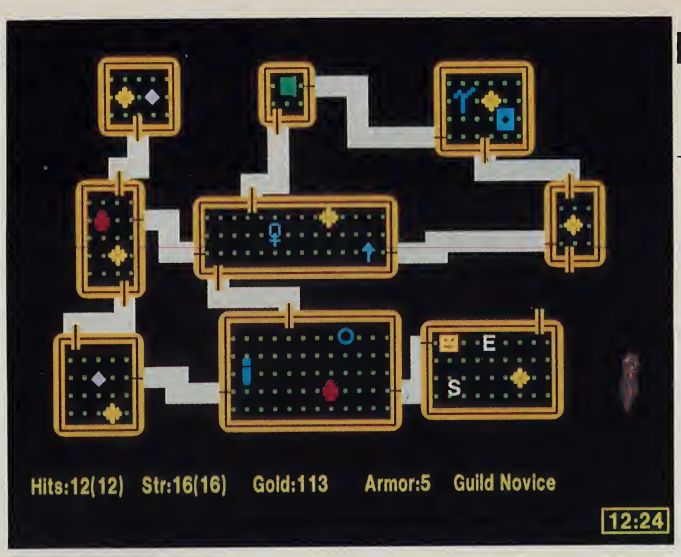
(To determine which chip your computer is equipped with, type in POKE 623,64 at the READY prompt in Basic. If the screen turns black, you have the GTIA chip installed. If the screen doesn't change, your Atari has a CTIA. Some distributors carry GTIA replacement chips; check around for availability.)

All in all, the premier release by Pandora must be declared successful. The 4000-plus hours of programming they invested in the game are evident and proof that big things do come in small packages.—***Andy Eddy***

Powerstar

System and Price: 16K GTIA-equipped 400/800/XL/XE; $39.95
Type: Graphic adventure game
Manufacturer: Pandora Software
177 Carlton Lane
N. Andover, MA 01845
(617) 681-8440

PLAYABILITY
CHALLENGE
ADDICTIVENESS
EASE OF LEARNING



Rogue

System and Price: Atari ST; $39.95
Summary: Complex and challenging fantasy role-playing game
Manufacturer:
Epyx
1043 Kiel Ct.
San Mateo, CA 94403
(408) 745-0700

PLAYABILITY

CHALLENGE

ADDICTIVENESS

EASE OF USE

Epyx's new fantasy role-playing adventure game, *Rogue*, is a conversion for the Atari ST from a mainframe version. I have not seen the original version, but I find it hard to imagine that it could approach the quality of this eye-catching and well designed adaptation.

Running in low-resolution mode, *Rogue* presents a detailed representation of a dungeon, which is generated anew at the start of each game. The dungeon is replete with treasures, including your ultimate goal, the sacred Amulet of Yendor, and unpleasant monsters like orcs, bats, and slimes, all of which are quite colorful but not animated.

Looking down on the dungeon, you can view an entire level or zoom in to inspect your character's immediate surroundings. Playability is greatly enhanced by a Fast Play mode, which allows you to continue to move through a winding passageway or across a room until you run into a wall or meet or pass within a square of a monster, treasure, or door.

When you encounter a monster, you can engage it in combat by wielding a weapon and advancing on or shooting at it. Each monster has its own fighting characteristics, and the outcome of any confrontation is decided by "a roll of the dice," which is influenced by your strength, weapon, and armor characteristics, as well as by the monster's strength. Each time you defeat a monster, you rise a bit in rank, gaining strength and other vital attributes.

Among the treasures you find are food, weapons, armor, magic scrolls and potions, and, of course, gold. A window on the righthand side of the playing screen depicts the contents of your pack with realistic symbols.

In general, you should hold off using the magic potions and scrolls until absolutely necessary. The problem with this strategy is that potions and spells are not identified until you use them (the names of spells and the colors of potions change in every game), and some of them can invoke danger—for you! It is just this sort of carefully thought-out paradox that keeps *Rogue* interesting.

The beginning of the game—the first nine or so dungeon levels—is a great deal of fun, because most the monsters are relatively easy to beat, and the treasures are plentiful and varied. I recommend that when you replay the game, you do so from the start each time until you hit a particularly good collection of goodies. Then save the game and use it as a starting point for subsequent plays.

The graphics in *Rogue* are of professional (arcade-style) quality, and the user interface is exceptionally friendly. For example, instead of numbers, colored bars are used to depict your fighter's vital statistics, so you can easily ascertain your character's current condition at a glance.

I recommend *Rogue* highly to those who enjoy hacking and slashing their way through hours of good clean fun. I'll meet you on level 26!

—David Duberman

Switchboard 3.1

System and price: Atari ST, Hayes- compatible smart modem; $34.95
Summary: BBS software for up to 256 users
Manufacturer:
SST System
P.O. Box 2315
Titusville, FL 32781
(305) 269-0063

SST's *Switchboard* can turn your ST (equipped with Hayes-compatible 300/1200 baud smart modem) into a fairly sophisticated BBS (Bulletin Board System) capable of handling accounts for up to 256 individual users. The *Switchboard* BBS supports electronic mail and file transfer, and features password protection for controlling user access.

Conceptually, the *Switchboard* BBS is set up as a "building" with nine floors, each containing as many as 100 "rooms." The rooms are areas in which messages are stored, and later read, by users. A single message cannot be longer than 24 lines of 75 characters each, but the BBS can hold up to 256 messages at once.

Floor 1 is structured as a public area—anyone with a password can access it and read the messages posted there. Entry to floors 2 through 9, however, is restricted to users who have been given access privileges by the system operator. Moreover, to prevent unauthorized or annoying messages from appearing on the board, the sysop can bar even a privileged user from posting messages directly.

Switchboard supports upload and download of electronic mail (Email). Although anyone permitted access to the board can receive Email, the sysop can decide who is allowed to send it. To prevent copyrighted material (such as pirated software) from passing through the BBS, the sysop must review uploaded material before making it available for downloading. Further, *Switchboard* permits the sysop to name certain users as highly privileged "associates." These associates can then assist the sysop in editing material on the board by "hiding" undesirable messages or files. They cannot, however, delete these files permanently.

Switchboard works hard to simplify the sysop's task of monitoring and updating information on the BBS. Overall, the features of the program, particularly its floor/room departmentalization system, provide an effective combination of flexibility and security, making this product well worth consideration. *—Bob Cockroft*

DBMan: The Power and The Glory

Atari's full-featured, relational data base manager for the ST is simple enough to use at home, complex enough to handle business applications.

DBMan and *dBase III* are prime examples of the most powerful data base application generators available. That is, they provide the wherewithal for microcomputer aficionados to prepare data bases to keep track of an incredible variety of business and household information. Applications run the gamut from a list of vintage wines in the cellar of a connoisseur, to a complete accounting system, replete with the journals, the ledgers, and the rest of the time-honored systems that so delight the Certified Public Accountants of the world.

I am familiar with *dBase III Plus* and all of its ancestors, and considerable academic debate could be squandered on the specific differences between such commanding programs. This, however, would be useless speculation for readers of this magazine, because *dBase* has not yet been adapted to the Atari ST series of computers. When and if it is, such a comparison may be in order. However, it should be noted that many of the capacities and conventions of *dBase* should not have great difficulty making the transition to *dbMan*, nor vice-versa.

DBMan offers much for those willing to devote the time and effort needed to realize its full potential. *DBMan* must rank high on anyone's list of powerful and sophisticated data base programs, regardless of the computer system involved, and should be carefully considered by Atari ST owners who want to unleash the raw power of their marvelous machines.

Unfortunately, this brief article can only describe the rudiments of *dbMan* and convey a rough idea of its capabilities and utility.

Bill Jacobson is the owner of Computer Database Designs of Fairfax, VA. He has lectured extensively in Europe on microcomputer matters, and his articles have appeared in several national magazines.

dbMan

System and price: Atari ST; $149.95
Summary: Very flexible implementation of a comprehensive relational data base program.
Manufacturer:
Atari Corp.
P.O. Box 3427
Sunnyvale, CA 94088
(408) 745-2000

Why an Application Generator?

There are two classic methods for creating files that permit you to store reams of important information and then readily retrieve it for reports, analyses, mailings, and other purposes. The first method starts "from scratch," using a standard programming language like Basic or Pascal, and the second makes use of special data base management system software.

The latter approach simplifies the development process with features that relieve the user of a significant amount of programming tedium. The differential for preparing a Basic program and one using *dbMan* can be enormous, with *dbMan* normally consuming only a small fraction of the time needed to accomplish the same task using most conventional programming techniques.

Despite this relative simplicity, *dbMan* provides immense flexibility; applications can be as simple or complex as necessary. A modest set of data base tasks can be defined and up and running in a matter of minutes. Data stored under the aegis of another program can then be transferred to your Atari ST and read into your new masterpiece, even if these data are located on a computer that utilizes the CP/M or MS-DOS operating system.

This transfer technique is called "porting," and involves the transmission of data files from one computer to another through a null modem cable using the serial or communication ports of each machine.

Bear in mind the words "relative simplicity." While uncomplicated data base designs are a snap, full fledged *dbMan* or *dBase* applications with intricate sets of instructions and lots of special features may be formidable and time-consuming to prepare, debug, and modify.

A critical issue is the capacity of your data base program to do what you want it to do. You may quickly become frustrated with the limited capabilities of lesser programs. It is far less likely that you will suffer that fate with *dbMan*. The extra time and effort required to master *dbMan* should pay off handsomely in the long run.

Installation and Capacity

There are no special routines for installing *dbMan*, and the program is not copy protected. Simply copy the master program disk onto a blank formatted disk, then boot the program in the normal manner. A disk of sample files is provided for tutorial purposes.

The only hardware requirements are an Atari 520ST or 1040ST, one disk drive, a monitor, and a minimum of 400K of available RAM.

The information capacities of *dbMan* are identical to those of *dBase III*: 128

By BILL JACOBSON

fields per record, 4000 bytes per record, 2 billion records per file, 10 open database files, and 128 bytes in an index key.

Among the more important features of *dbMan* are its relational capabilities. The capacity to have ten open database files means that you can interactively intermix information stored in ten different source files. For instance, you may wish to tap data from Clients, Orders, and Parts files to produce a single report.

Data base files can be indexed to speed up data inquiries and to arrange/sort data in a specified order. For example, you can index a data file by zipcode for a mailing list, or by client number for a billing cycle. The keys for these indexes (i.e., the combined length of all field information included in the index specification) can be up to 128 characters long. The key may contain all data stored in one or more fields (perhaps all 18 characters for city alone, or all 20 characters for the combination of state and city), or only a portion of the data stored in sets of fields, using the so-called substring manipulation commands of *dbMan*.

The latter capability may be important if only a limited amount of data in a long field are required to establish the proper sort order. Indexes are stored in separate files on disk, and the longer the index key, the larger the file.

Four types of data entry fields are supported: Character (alphanumeric fields of up to 254 bytes in length), Date (range of 1/1/1860 to 12/31/2039), Logical (true/false responses), and Numeric (15-digit accuracy).

The contents of data entry fields can be regulated using the PICTURE and other commands and functions of *dbMan*. For example, you can prescribe the following "picture" for a phone number field: (999) 999-9999. With this specification, only numbers can be entered into the field, and all punctuation is automatically inserted. This feature greatly speeds up data keying, and may reduce entry errors.

Like *dBase* and most popular data base programs, data are saved on a floppy or hard disk as fixed length records. Each record created in a database requires the same amount of disk space (1000 characters for a record that is 1000 characters long), even if some data entry fields are not filled, or individual fields are only partially completed. Thus, if you are using a floppy disk based system and want to cram large numbers of records on a single disk, be very conservative when defining the length of data entry fields. Otherwise, you may find that you have wasted a significant amount of precious disk space.

How It Operates

DBMan is a command-driven data base application program. That is, it requires you to enter a specific command or a set of related commands to accomplish the desired action(s). You are not limited to the options prescribed by totally menu-driven programs, where "what you see is all that you can do." The usefulness of a *dbMan* application is constrained only by the boundaries of your imagination.

But the flexibility of *dbMan* requires that you become familiar with the names, purposes, and consequences of many sets of functions and features. An excellent on-line help function is always on tap to assist in this process, as are the tutorials and more detailed references presented in the user manual.

Once the program is booted, you are greeted with the screen shown in Figure 1. This screen contains a command line for entering instructions to be executed by the computer. For example, if you want to define a new data file called Clients, you would enter CREATE CLIENTS on the command line. The same type of screen appears when you modify the original definition. The screen shown in Figure 2 then appears, and information on each data entry item (field) can be entered. If you want to access this data file, enter USE CLIENTS. The Clients file then becomes the primary data file, and you can perform such tasks as:

- APPEND to add new records.
- EDIT to modify existing records.
- INDEX to provide fast access to records and display data in the order of the indexed field (e.g., if you index the file on City and activate that index, all records are sorted by city).

```
CMD: List Structure

MSG: Done                                        FP Company.DBF     Rec 1
------------------------------------------------------------------------------
                                                  F7=Mem F8=Sta F9=Err F10=Cmd

    fieldname          type          width        decimal
1 NAME                  C             40
2 ADDRESS               C             40
3 CITY                  C             19
4 STATE                 C              2
5 ZIP                   C              5
6 PHONE                 C             14
7 INDUSTRY              C             51

Record size :    171
Number of records :     248
File name : Company.DBF
```

Figure 1. DBMan Command Screen (with database structure listed).

```
CMD: Create Test


MSG:                                          FP Test.dbf     Rec BOF
------------------------------------------------------------------------------
^S=save ^Q=quit ^N=nxt ^P=prv ^E=era ^I=ins     F7=Mem F8=Sta F9=Err F10=Cmd

    fieldname          type          width        decimal
1 COMPANY               C             50
2 ADDRESS               C             30            Bytes remaining : 3900
3 CITY                  C             18            Number of fields :   5
4 STATE                 C              2
5
```

Figure 2. DBMan File Creation Screen.

You can select *a report that commands the computer to produce the specified printed output automatically.*

• DISPLAY or LIST to extract information from the file; all records or some user-defined subset of information can by displayed. Figure 3 provides an example of this type of inquiry.

• COPY to transmit all or a portion of the primary file to a new file, or to an export file of data to be used (imported) by a spreadsheet, word processing, or other program.

DBMan does not support a mouse interface; all commands and instructions must be entered from the keyboard, and multiple documents cannot be viewed/windowed at the same time. This may be remedied by the next version of *dbMan*, the release date of which has not been announced.

The current lack of mouse-assisted interactions does not present a major problem. Data base programs tend to be very "keyboard intensive," and I doubt that the promised mouse-based version of *dbMan* will significantly alter the character or basic operation of the version (2.02L) examined in this article.

Preparing Custom Menus

For more complex applications, it may be necessary to prepare custom menus and to set up special data processing routines that are difficult to handle ad hoc from a command line. To accomplish this, *dbMan* has a procedural language capability that permits all of its features to be "called" (activated) from one or a series of special command programs.

This type of turnkey application is important if computer neophytes are to enter data into a system or to extract reports from it, but it is equally important for experienced computerists when large numbers of command programs and intricate routines are invoked. A primary asset of computers is their capacity to simplify the complex and thereby reduce the incidence of errors to the lowest possible level.

DBMan enables you to accomplish this by making the intricate workings of a cleverly devised system transparent to users, thus permitting them to concentrate on the quality of data entry and output, rather than the mechanics of the way in which this procedural magic is accomplished.

Any number of menus, each of which is geared to the operation at hand, can be prepared. For example, a main menu may have a REPORTS option listed, and from that submenu you can select the type of report to run (e.g., invoices, client lists, etc.). Each submenu lists the specific reports that have been defined.

You can then select a report that commands the computer to produce the specified printed output automatically. Or you may be asked to enter information that determines the type or sequence of data to be presented in the report, such as zipcode ranges for mailing labels or dates for notices of overdue accounts. All of this and more can be specified in the command programs you devise.

A simple menu program is presented in Figure 4. In this illustration, only the words enclosed in quotation marks after each SAY command actually appear on-screen at the locations specified. For example, the first SAY command stipulates that display of the message "1 ORDER ENTRY" will start at column 20 of line 5.

```
DO WHILE T
  @ 5,20 SAY "1 ORDER ENTRY"
  @ 7,20 SAY "2 PRINT INVOICE"
  @ 9,20 SAY "3 QUIT"
  @ 11,20 SAY "Enter your choice (1,2,3): "

  WAIT TO CHOICE
  DO CASE
    CASE CHOICE = '1'
      DO ENTRY
    CASE CHOICE = '2'
      DO INVOICE
    CASE CHOICE = '3'
      CLEAR
      CANCEL
    OTHERWISE
      @ 0,0 SAY 'You must enter a 1,2, OR 3."
  ENDCASE
ENDDO
```

Figure 4. DBMan Menu Program Example.

The data entry person, when confronted with this menu can press the number 1 key to record new orders in a data file, the number 2 key to print out invoices for orders already entered, or the number 3 key to leave the menu. If any other characters are entered, the OTHERWISE command is invoked, and the message "You must enter a 1, 2, or 3" appears.

Once ORDER ENTRY is selected (CASE CHOICE 1), another command program containing the necessary instructions for that activity is run (DO ENTRY). If the PRINT INVOICE option is chosen (CASE CHOICE 2), yet another command program is executed (DO INVOICE). The operator is returned to this menu screen at the completion of each entry or print action until the QUIT option is selected (CASE CHOICE 3). At that time, the loop created with DO WHILE . . . ENDDO command is broken (CANCEL).

Other types of command programs follow a similar pattern with line-by-line instructions fashioned for each operation to be performed.

Command programs must be prepared with a word processor or text editor that produces standard text files (those without peculiar instructions or control codes inserted into the text). You must leave *dbMan* to create these files and return it to test and run them. Error messages appear when the debugging routine of *dbMan* isolates a problem, and you must repeatedly return to the text editor to enter the necessary technical and logic changes. Once all is well, however, the program will give you what you want, the way you want it.

```
CMD: List name,phone for state="CA" and industry="Aerospace"

MSG: Done                                FP Company.DBF    Rec EOF
-------------------------------------------------------------------------
                                              F7=Mem F8=Sta F9=Err F10=Cmd

106  Northrop Corporation                (213)-553-6262
126  Rohr Industries, Inc.               (619)-691-4111
227  Lockheed Corporation                (818)-847-6121
```

Figure 3. DBMan List Command Inquiry Example.

These command programs may be very simple, like menus that display options for calling up standard routines for entering (APPEND), modifying (EDIT), and viewing (DISPLAY) data, or may involve very elaborate sets of program modules and procedures that are called up as needed from a master program. This modularity is important for those who prepare different applications containing common or similar objectives and requirements.

Once a given report or other program module works satisfactorily, it can be used again and again with only minor changes to the original. Many programmers maintain a large library of modules, thereby obviating the necessity to re-solve the same problem each time it is encountered in a new situation. In addition, modules simplify the debugging of programs by limiting their size and permitting you to isolate and correct problems quickly.

A partial list of the commands and functions used by *dbMan* is presented in Figure 5.

Reports

DBMan offers three methods for producing reports, any of which can be sent to the screen, to a printer, or to a file stored on floppy or hard disk. The simplest of these involves data produced with the DISPLAY or LIST command. For example, the command LIST CLI-

COMMANDS

@ SAY...GET	Displays information at a specified screen location.
ACCEPT	Reads information from the keyboard and stores it in a memory variable.
APPEND	Adds records to the primary database.
CONVERT	Transforms dBase files into dbMan files.
COUNT	
DISPLAY	Permits incremental viewing of all or a portion of a file.
DISPLAY STRUCTURE	Lists fields defined for the primary database.
DO <filename>	Run command program named.
DO WHILE <expression>	Repeats instructions until expression is false.
EDIT	Modifies existing records.
FIND/SEEK <expression>	Searches for strings that match the expression.
GO/GOTO	Repositions the record pointer.
IF-ELSE-ENDIF	Controls the conditional execution of commands.
INDEX	Creates an index file in ascending or descending order.
INPUT	Accepts data from the keyboard and stores it in a memory variable.
JOIN	Creates a new database by combining fields from two files.
LIST	Scrolls data specified in a LIST command statement.
LOCATE	Moves the pointer to the first record that meets scope criteria.
LOOP	Execution of program loops to the beginning of a DO WHILE statement.
MERGE	Merges data into a letter/skeleton file.
MODIFY	Changes database, fieldname, or report information/ specifications.
PACK	Erases records marked for deletion.
READ	Displays the contents of memory variables or fields.
RECALL	Removes the deletion marker from the records specified.
REPLACE	Globally alters the contents of specified field.
SELECT	Specifies which data file is the current/primary file.
SET	Specifies environmental conditions for the program, such as default files, drives, indexes, procedures, relations, and video attributes.
SORT	Sorts specified fields into the named data file.
STORE	Stores variables in memory
SUM	
TOTAL	
UPDATE	Updates primary database file with information from another file.
USE	Opens a defined database file.
ZAP	Erases all records in the specified file.

FUNCTIONS:

ABS	Absolute value of an expression.
APPROX	Locates the approximate value of a FIND string.
AT	Substring search function.
BOX	Draws a box at the defined screen coordinates.
CENTER	Centers data within the width parameters specified.
CTOD	Changes a character string to a date string.
DATE ( )	Returns the system date.
DAY	Returns the day of the month.
DOW	Returns a number that represents the day of the week specified.
DRAWLINE	Draws the specified horizontal line.
INT	Returns the whole number value of a numeric expression.
KEYSTROKES	Returns the total number of keystrokes used.
LEN	Indicates the number of characters in a string.
LTRIM	Removes leading blank spaces from a string.
MIDSTR	Replaces a portion of a string with the specified string.
MONTH	Returns the number of the month specified.
ROUND	Rounds a number to the specified number of decimal places.
RTJUST	Right justifies a string.
SOUNDEX	Returns the soundex code which permits identification of words that sound alike.
STR	Converts a numeric value to a character string.
SUBSTR	Generates a new string from a specified portion of another string.
TIME	Returns the current system time.
TOMONEY	Converts a numeric dollar value to its English word equivalent.
TONAME	Converts the first character of all words to upper case, and all other characters to lower case.
TRIM	Deletes trailing blank spaces from a string.
UPPER	Converts a string to upper case letters.
YEAR	Returns the four-digit year of the specified date.

Figure 5. Partial List of dbMan Commands and Functions.

DBMan offers three methods for producing reports, any of which can be sent to the screen, to a printer, or to a file stored on disk.

ENT NAME,CITY,PHONE FOR STATE='CA' TO PRINT will produce a printed list of those data.

The second uses a built-in report writer to prepare columnar reports. You can define a report format file by following the simple instructions that appear on-screen. Report specifications can include headers, footers, definition of fields on which data are to be grouped (e.g., if grouped on State, the name of each state will appear only once), totals, column contents, column headings, and a variety of other options. Up to 20 data fields, of which 13 can be totaled, can be specified for a report. This second method will probably be adequate for most of your reporting needs.

The third method involves the procedural language capabilities of *dbMan* and must be used for highly complex reports for which the previous methods are inadequate. The contents and layout of the report must be specified, line by line, in a command program. The amount of time, effort, and skill needed to prepare such reports is directly proportional to the complexity of the output. If several files are involved, indexing and special data processing are needed, and the layout of the report is quite intricate, considerable effort may be required.

Documentation

The tabbed and indexed user manual provided with *dbMan* is a satisfactory general guide to the commands and functions of the program, but will not satisfy those with voracious appetites for detailed information on, and elaborate examples of, how the program works. This is not an unusual situation; the more powerful a program is, the more difficult it becomes to explain its inner workings adequately. A manual two or three times the size of that provided might still be insufficient.

Even so, the documentation of many functions is very skimpy, and the examples used too rudimentary for all but the simplest of applications. Experimentation and experience should readily overcome these problems, but a more detailed manual certainly would streamline that process.

It would also be useful to have a quick reference card that briefly explained the abundant commands and functions of *dbMan*. The aforementioned on-line help feature is not available during the preparation of command programs (these must be prepared with a text editor from outside *dbMan*), and a reference guide would be less cumbersome to use than the manual for that purpose.

Technical Assistance

DBMan is produced and was, until recently, marketed directly by Versa-Soft Corporation of San Jose, CA. Under a recent licensing agreement, the ST version is now marketed by Atari. Technical support is provided by Atari's customer service staff.

Updates to the program will be covered by Atari's standard policy: When a new version is released, you can obtain an update by returning your old disk to Atari with $5. If revisions are extensive enough to require substantial changes in the user manual, Atari will supply a new one for about $5 more.

Ease of Use

As indicated earlier, *dbMan* is very easy to use for simple applications and progressively less so for more complicated data bases. Highly involved applications may demand considerable time and effort to complete. If your uses fall at the "simple" rather than the "difficult" end of the ease of use spectrum, you will probably have no difficulty putting *dbMan* to work for you.

If time is a factor, you can undertake more complex activities incrementally, designing only the most critical data entry files, menus, and data processing procedures at first, adding more features as your skills mature. This approach may be especially desirable when more complete information on application requirements and refinements can be gained through operator and end user comments—when more people have hands-on experience with the basic system.

Because command programs are such a critical feature of *dbMan*, I would like to see a built-in text editor added to future versions, along with the capacity to access an external text editor directly from inside *dbMan*, if you find another editor more to your liking. This would greatly streamline the preparation and modification of programs. No longer would you be forced to leave and then re-enter *dbMan* for each step of the program preparation, testing, and de-bugging process.

Summary

If you seek a very powerful data base application generator that will allow you to grow into it as your computer and data base skills increase—a program that you will not have to discard once you reach a relatively high level of achievement, *dbMan* may well be the answer to your prayers.

If your current or potential uses involve moderate to complex applications, *dbMan* may be the best choice you can make; it should satisfy the needs of even the most demanding users. At a list price of only $149.95 for a serious workhorse of a package, *dbMan* also is a bargain of the first order. ■

"Take these data, Miss Enderby, and hide them in the computer."

Seems Like Old Times

Teletalk

By JOHN J. ANDERSON

Lordy, times do change. It is my great pleasure to be writing for you in *Atari Explorer*. And it is a great pleasure to be working once again with two long-time colleagues, David Ahl and Betsy Staples. Though things are so very different now, it seems just a bit like old times, when we worked so hard to get *Creative Computing* magazine on the stands month after month.

The Atari 520ST has now passed the quarter-of-a-million mark in units sold and continues to sell very well. Over 300 software packages are now available for the ST, in all categories, from entertainment to advanced database management. Non-believers can gain faith from the ST Software Catalog published by and available from Atari. It contains nearly 350 pages of software listings, descriptions, prices, and manufacturers, and costs $9.95.

One of the software areas in which great strides have been made over the past year is telecommunications, and the implications of this are far-ranging. I can remember my excitement when I first got that barest-of-bones VT-52 terminal emulator accessory, provided free with the 520ST, up and running. Despite the fact that there was no download or upload capability, no logging capability, and not a single convenience feature, I was thrilled. My Atari ST was communicating with the outside world, and that was the important thing.

And while telecommunications networks like Genie and Delphi continue to grow (and we will report on them in upcoming columns), CompuServe is still the premier network for Atari owners. Yes, their prices have gone up. It now costs $12.50/hour off-peak at 1200 baud. But considering the ST programs and the informed crowd you can find on the CompuServe AtariSIG, it remains a worthwhile bargain.

I was on the phone with SIG sysop Gary Yost a few days ago, and a couple of days later I received a program called *Flash*, from Antic Software. Gary and I have known each other for years, and I knew he wouldn't just hype me. But he couldn't seem to stop telling me what a terrific package *Flash* was, how its authors, Joe Chiazzese and Alan Page, had created the ideal terminal environment, where every imaginable feature was just a keypress away, and where a

point-and-click or command-style interface satisfied beginning, intermediate, and advanced users.

Well he was quite right. I have had a good deal of experience with terminal packages for that other desktop metaphor machine (the one with the picture of a fruit on it) and so was prepared for a let-down. But *Flash* is all Gary said it is, and more. It didn't take much more than a test drive for me to decide it was my terminal package of choice.

Flash, which retails for $39.95, so impressed CompuServe that the service bundled it with a free lifetime subscription and a credit for $15 worth of free connect time. CompuServe doesn't offer free time the way it used to, and the folks there must have thought a lot of the package to make such a generous offer. The software effectively costs only $25 if you subtract the value of the subscription and free online time from the package. That is a tremendous deal for the power of *Flash*.

Making full use of Digital Research's friendly GEM interface, *Flash* has a built-in text editor which can be accessed at any time to prepare electronic mail. Xmodem protocol is included for error-free file transfers, and a powerful script language is available to create custom commands for unattended operation. The keyboard may be reconfigured, and script files automate such things as online Email checking, log-on, and designation of transfer files.

Flash is the first telecommunications software for the Atari ST that offers both VT100 terminal emulation and Vidtex graphics. Vidtex lets you view hi-res pictures on CompuServe and save them to disk, if desired, in a format compatible with popular ST paint programs.

In addition, *Flash* will dial the phone for you. It allows you to define your own translation tables, and customize the ten function keys with macros of your choice. DO files allow you to create multi-step, "smart" macros, which can even call other DO files. This feature allows you to automate tedious portions of your telecommunications session. For example, you can create a DO file that will execute a file transfer unattended. Figure 1 shows you how.

Note that any carriage returns used in the file itself are ignored by *Flash*; only the vertical bar (|) is recognized as a "hard" return character. This means DO files can be easy-to-read.

The capture buffer in *Flash* operates automatically and in parallel with the terminal mode. With a click of the mouse, you can move between terminal and buffer mode. One of the most convenient features of the program is that the buffer can be edited on the fly. You can move through the buffer using the scroll bars, making whatever additions, deletions, or changes you wish, then save to disk, print out, or transmit buffer contents.

I was impressed with *Flash*, and as I have said, I can offer no better endorsement than to state that it is the terminal program I now use. I was further gratified to discover that the program is unprotected and can be copied to a TOS system disk. ■

Figure 1.

```
>DU HA| (sets duplex to half)
>LF ON| (sets linefeed on)
>EC ON| (sets echo on)
>AS 2| (sets ASCII pause after line to 2)
WAITING FOR COMMAND SYMBOL| (sends this as text message)
>CA ON| (opens capture buffer)
>WA!| (wait to receive an exclamation point)
>DL XM B:PROGRAM1.PRG| (download program via Xmodem protocol)
>DL XM B:PROGRAM2.PRG| (do it again for another program)
FILES RECEIVED, WAITING FOR SYMBOL TO SEND FILE| (message)
>WA!| (waiting for another exclamation point)
>UL AS A:LETTER.TXT| (upload a letter in ASCII format)
THANKS AND GOODBYE| (message)
>CA/| (close capture buffer)
>SA CA B:CAPTURE.TXT| (save capture buffer)
+++AT| (query modem)
>WA OK| (wait for modem to come back with an OK)
ATH| (tell modem to hang up the phone)
>B2| (ring the bell to indicate completion of sequence)
```

It didn't take much more than a test drive to convince me that Flash was my terminal package of choice.

Atari backs user group shows; JACS offers Print Shop graphics

User Friendly

By BETSY STAPLES

***Atari** provides expertise and economic resources, and the group provides manpower.*

A program that can net a user group income, recognition, and scores of new members at virtually no cost—what could be better? Not much, according to user group leaders in California, Utah, Oregon, Pennsylvania, Colorado, and Virginia who have signed up to hold Atari shows and expos in their areas.

The brainchild of Atari Board Chairman and CEO Jack Tramiel, the program is designed to encourage user groups to hold local shows by providing assistance with organization and promotion and by advancing the funds necessary to get the show off the ground. In essence, Atari provides expertise and economic resources, and the group provides manpower.

Atari, says User Group Coordinator Sandi Austin, expects the advance to be repaid from show revenue; any remaining profit belongs to the sponsoring group. If revenue from the show is insufficient to cover the advance, the group does *not* have to make up the difference.

Sandi is the liaison between the sponsoring user groups and Atari. She helps members plan promotional campaigns, line up top speakers, and attract major exhibitors.

At each show, Atari takes a large booth, where both management and technical people are on hand to talk with showgoers and answer their questions. Other exhibitors include local dealers and vendors and well known manufacturers of products for both 8-bit and ST systems.

According to Sandi, quite a few user groups have expressed interest in sponsoring shows, and seven have made firm commitments as of this writing. If you would like more information on the program for your group, call Sandi at (408) 745-2012. Details of shows to be held in the coming months follow:

The Northern California Atari Expo will be held in the San Jose Convention Center September 20 and 21. Sponsorship is being shared by five groups: ABACUS, BAAUG, COAST, DACE, and SLCC.

A show in the Coliseum in the Portland, OR, Convention Hall is being sponsored by PACS on October 10 and 11, and NOVATARI will sponsor one in Fairfax, VA, on November 8.

PACE is scheduled to hold a show on November 22 at the Double Tree Inn in Pittsburgh, PA, and RMAUG is planning the Rocky Mountain Computer Fair for February 20, 21, and 22, 1987 in Denver, CO.

On March 13, 14, and 15, ABE's ACES will sponsor a show at the Holiday Inn in Allentown, PA, and several groups in the Seattle, WA, area are

making plans for a show there in May.

Other probable venues include Salt Lake City, UT; Milwaukee, WI; Detroit, MI; southern New Jersey; and the New York Metropolitan area.

In addition to the technical and management luminaries from Sunnyvale, you can expect to see *Explorer* staffers at some of the shows. We plan to attend as many of the East Coast expos as our busy publication schedule allows, and we hope to meet many of our readers.

Print Shop Graphics

The release of Broderbund's *Print Shop* in Atari format was a boon to amateur artists everywhere. Once they got hooked on the program, however, Jersey Atari Computer Society members Irv Feinberg and Bob Whipple found the library of graphics included on the disk inadequate to satisfy their newly awakened artistic desires.

They began to create their own images and soon discovered that other members of JACS were doing the same thing. Feinberg then carried the concept one step further, thinking "if members of our user group are creating new graphics, other user groups are probably doing the same." So he wrote to other groups, offering the services of JACS as a clearinghouse for the designs users wanted to share.

To date, 16 groups have responded with contributions, and JACS has compiled three volumes of graphics, each featuring more than 110 images.

Just a few of the designs available to Print Shop users in collections compiled by JACS.

To those groups that would rather buy than create, the New Jersey users offer Volumes 1, 2, and 3 with full documentation for $10 each. In addition, the purchasing group receives permission to duplicate the disk and offer it to their membership at any price they choose. This, says Feinberg, "should help the groups finance some of their other activities."

To date, requests for disks have been received from as far away as Germany and Australia.

If your user group would like to participate in this exchange, as either a supplier of graphics or a purchaser of disks, write to JACS, Box 710, Clementon, NJ 08021.

"Of course this isn't all the documentation. It's just the index."

User Friendly is a regular feature of *Atari Explorer*. If your user group has had an experience or undertaken a project that you think other user groups would benefit from learning about, please write a short description of the circumstances and the results, including photos or illustrations if possible.

We cannot acknowledge these submissions, nor can we accept ideas or inquiries by telephone, but we will choose the most interesting ones and help you to share them with your fellow Atari enthusiasts.

Send material to:

User Friendly
Atari Explorer
7 Hilltop Rd.
Mendham, NJ 07945

"Gentlemen, Ladies, boot your systems"

Programming Challenge

By JOHN B. JAINSCHIGG

I have long believed that when it comes to programming, Atarians are the best—hackers *nonpareil*. First of all, there are the machines. You can probably do more in fewer bytes or lines of code on an Atari home computer than you can with any other architecture available on the home market today. . .and the ST? Well, it's the ST—need I say more? Second, there are docs—what other computer manufacturer has made so much inside information, right down to ROM code, available to developers and the general public? Third, there are languages: from easy-to-use Pilot, to out-of-this-world Prolog, and on down to the metal with assemblers galore, you can get it all on an Atari. Last, and most important, there is the Atari ethos: make it flexible, make it fast, make it clean, and make the price right—"Power without the price"—which isn't, after all, that different from the way a good programmer should think when plying his or her trade.

So what kind of programmer are you? I'm John ("GTIA") Jainschigg, local Atari evangelist and semi-pro guru, and I would like to find out. Each issue, a group of my more depraved cronies and I are going to dream up a programming challenge that can be solved in a variety of ways: high-level, low-level, abstract, or bare metal. Then we are going to sit back, wait for your solutions, and pick the ones we like best in a completely subjective, nonscientific manner. We'll award the winners a grandiose and disproportionate amount of. . .

FAME AND EXPOSURE!

You got that right. We will publish the winner's code and commentary so that all the losers can type it in! We will heap praise upon the winner's head until it swells to bursting! Last, but not least, we will show the winning entries to *influential people in the business!*

The Fine Print

There is *no* fine print. Any Atari computer, any language, will do. We just want lean, mean, clean, well-documented code. Don't worry, no particular Atari model, language, or approach will be favored by our distinguished judges—as we programmers always say: "use what works." And remember, because our prizes are largely insubstantial, we can afford to give out a lot of them. We will even recognize "near misses" and try to show where improvements can be made. So—regardless of your programming experience—if you think yourself a hacker (or hackeress) get with it! Entries must contain:

- A fully documented (I mean, to the *max*) listing of the main program, including documented source code for any assembly language.
- An executable copy of the program on magnetic media compatible with normal Atari disk or cassette peripherals and operating systems. It's not that we don't *like* 1 meg 8″ CP/M disks and wafertapes, but we find they stick in our toaster.
- Full instructions on how to execute the program.
- A brief commentary on the program, pointing out any particularly elegant hacks, and a capsule autobiography. This must be written in a language spoken by more than 800,000 people worldwide. Extra credit if it rhymes.

Only original, unpublished material will be considered. All entries become the property of Atari Explorer Magazine. Entries may not be submitted by employees of Atari (U.S.) Corporation and its subsidiaries, nor by members of their immediate families.

Challenge #1

Ready? Okay. Turn on your TV set. Get Video Disco Sri Lanka turned in re-e-e-ally carefully, so you can count the hairs in the VJ's nose. Now go outside and kick over your satellite dish. Come back and take a look—TV snow!

We know how hard it is to get real TV snow these days, what with cable and satellites providing clear-as-a-bell reception almost anywhere. But if you have an Atari computer, you have the equipment to simulate it programmatically.

So do it. The challenge is to produce a faithful simulation of TV snow in software. And we mean *faithful*. No half-baked "computer gone haywire" effects. We want that flat, even flicker—that gravelly, hissing noise a TV makes when it is tuned to sunspots. If you can get the basic effect in a few bytes of code (no more than a mouthful), you are inspired. If you can get that, plus a little vertical roll, you are inspiring. And if you can get all the above, graphics and sound, and make anybody who walks into the room feel a little lonely inside and start hunting for the channel knob—well, we'll probably start by giving all our judges polygraph exams.

Next issue: Nerve-wracking sounds Mom will order you to turn off! Watch for it! ■

What Next?

After the new wears off, many personal computers wind up gathering dust in a closet. Don't let your Atari be one of them.

Why did you originally buy an Atari computer? To do word processing? To compose music? To manage your business? To play games? Chances are, whatever your initial reason for buying an Atari, you've discovered that it has many additional capabilities and potential applications.

The flip side of the coin is that you've probably experienced some frustration as well. Maybe your word processing package won't do subscripts or underlining. Perhaps your database won't sort on as many fields as you need. Or, it could be that when you write a program, your whole system acts user-hostile.

Depending upon the balance between your satisfaction and your frustration, you may continue to use your computer or set it aside. But there is a better way: **Atari Explorer** magazine.

As the premier magazine for Atari computer owners, it is our responsibility to make sure that you get the most out of your computer. To us, that means making sure that your Atari does more than you bought it to do, more than friends and associates' computers do, and, indeed, more than you ever imagined that a computer could do.

To make sure that you get the most out of your computer, **Atari Explorer** brings you objective, in-depth reviews of hardware and software; up-to-date information about new products; practical tutorials; stimulating columns; thought-provoking articles; and valuable inside information.

Hard-hitting Evaluations

At **Atari Explorer**, we obtain new peripherals and software packages as soon as they are released. We put them through their paces in our on-site laboratory and also in the environment for which they are intended: home, office, lab, or school.

Our evaluations are unbiased and accurate. We are not afraid to call a spade a spade or a lemon a lemon. Our first obligation is to you, our readers, and editorial excellence and integrity are our highest goals.

Practical and Stimulating

We know that some of our readers are beginners and others are experts. Thus, it is our responsibility to make what we publish both comprehensible to newcomers and interesting to veterans. That does not necessarily mean that the material is simple; we know you like to be challenged. What it does mean is that we provide the inexperienced user with every possible means to seize the subject matter and make it his own.

However, we don't want the experts to be bored, so although articles are accessible to beginners, they are theoretically non-trivial, cover topics in depth, and present information on more than one level.

At **Atari Explorer**, we are intensely interested in all aspects of computing. Ours is the magazine of pragmatic applications, communicative graphics, stunning animation, mind-expanding games, and realistic simulations. We take our business seriously, but we have fun too. We are convinced that you will, too, when you go exploring with the **Atari Explorer** family.

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To order your subscription to **Atari Explorer**, send a check or money order for $14.95 for six issues or $39.95 for 18 issues (25% saving over the newsstand price) to: **Atari Explorer**, 7 Hilltop Road, Mendham, NJ 07945. If you prefer, you may charge your subscription to your Visa or MasterCard. We guarantee your complete satisfaction or we will refund the unfulfilled portion of your subscription.

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"Any sufficiently advanced technology is indistinguishable from magic."—Arthur C. Clarke

"Any sufficiently advanced technology is indistinguishable from a rigged demo."—Anonymous

Personal Pascal: An excellent implementation of a popular, high-level programming language

Personal Pascal

System and price: Atari ST, $74.95
Summary: Robust implementation of powerful programming language; one of the best.
Manufacturer:
Optimized Systems Software, Inc.
1221-B Kentwood Ave.
San Jose, CA 95129
(408) 446-3099

Anyone who really thinks about it knows that programming is a black art. The salient features of magic, as we understand it, are all part of the programmer's endeavor; the characteristics of the mage part of the programmer's makeup. Training, discipline, and concentration; susceptibility to the appeal of "secret knowledge"; a fondness for poring over obscure texts; a tolerance for loneliness and social isolation; an ability to function flexibly within the arbitrary constraints of dogma; a sensitivity to ritual—these form a diadem of qualities that grace the brow of sage and bitpusher alike.

In both cases, the object of exercising these qualities is also the same: to create a program—a spell in runic tongue—that sets in motion a process in the physical world. Ultimately, the magic of programming is found in mastery of language and symbols.

Wizards are quick to understand that mastery of any language carries a reciprocal effect: in mastering a language, it also, to some extent, masters *you*. Students of human languages, like Japanese, soon reach the same conclusion—in learning the language of a culture, one absorbs the culture, too. Yet programmers who concentrate their study in a particular language—be it Basic, C, or Pascal— are not so quick to understand how they come to adopt the norms of thought that inform their mode of expression.

The purpose of this column is to provoke dicussion about computer languages in the Atari universe. The proliferation of languages and development systems in both the Atari 8- and 16-bit environments encourages us to believe there will be a lot to talk about and share views and information on. The emphasis will be on learning and sharing resources; "getting into" new languages; keeping track of what is out there and what is coming. Some pretty knowledgeable people—Leonard Tramiel, Bill Wilkinson, Tom Hudson, Ian Chadwick and Russ Wetmore, to name a few—will be on hand to teach and share their views. We hope you will be, too.

This month, reviewer David Duberman takes a look at Personal Pascal for the ST, a powerful, integrated editor/compiler/linker from Optimized Systems Software, Inc. In the process, he gives Pascal newcomers a view of what that important language is like. Next month, we hope you'll join us once again as the focus shifts to C. Atari's Leonard Tramiel and Neil Harris will show dyed-in-the-wool Basic programmers how to start making a painless transition to the ST's C programming environment.—*Ed.*

Personal Pascal

Niklaus Wirth designed the Pascal programming language as a tool for teaching computer science and good programming practice. The importance of Pascal in computer education has grown steadily, and is now formally recognized; two years ago, the College Board selected the language for use in their Computer Science Achievement Test. But Pascal is more than a learning tool. As its popularity has grown, this complex, high-level programming language has gained wide acceptance in both applications and systems development.

Pascal facilitates the writing of large programs by encouraging programmers to code in modular fashion, subdividing a complex problem and solving each of its component problems with a small, self-contained routine. Unlike Basic subroutines, Pascal program modules (called *functions* and *procedures*) can be made truly independent—communicating with and affecting one another only through strictly defined channels.

A suitably "generic" Pascal module can thus serve as a building block in more than one application, without the programmer having to worry about how it might "step on" other routines with which it is combined.

Pascal programs are usually *compiled*—i.e., composed with a text editor,

By DAVID DUBERMAN

then fed to a special program called a "compiler" that turns them (usually) into stand-alone, machine-level code. Basic, by contrast, is an *interpreted* language; Basic programs are written and run in the presence of a support program that interprets, then carries out, each statement.

It usually takes longer to develop a program in Pascal (or any compiled language) than it does in Basic because the compiler environment makes programming a less interactive process. However, Pascal programs usually run quite a bit faster than equivalent Basic applications, and sometimes use less memory overall.

Introducing Personal Pascal

Given the importance of Pascal, it is heartening that a robust, efficient, and well-tailored implementation of the language is now available for the Atari ST. Personal Pascal, from Optimized Systems Software (OSS), a veteran publisher of programming languages for Atari computers, is a version of ISO (International Standards Organization) Pascal with many ST-specific extensions.

The single Personal Pascal disk includes an editor, compiler, linker (a program that binds sections of compiled code together with library routines, forming a working program), library files (containing code that represents the Personal Pascal "vocabulary"—used in linking), and demo programs, and is accompanied by a comprehensive, well-written, 280-page manual. In addition, OSS provides unlimited support for registered owners, both by voice, (408)446-3099, and via their own BBS, (408)446-3451.

Using Personal Pascal

The three Personal Pascal programs (editor, compiler, and linker) are run from GEM drop-down menus within a simple "shell," called The Manager. By integrating the programs through GEM, OSS manages to avoid the tedium inherent in working with compiled languages. Instead of editing, saving the source file, invoking the compiler by name, the linker likewise, and finally (if you're lucky, or very good), running the program itself, a single keypress saves the program, and compiles and links it automatically.

The Personal Pascal compiler and linker are astoundingly fast, as well. If you have a megabyte of RAM in your ST, you can put your source and the Pascal files on a RAMdisk and compile and link a 20K program in less than ten seconds.

The Personal Pascal editor is fairly basic. It doesn't use the mouse or windows, but is quite effective for creating and editing programs with a minimum of fuss. (A fully GEM-based editor is planned for the next revision of Personal Pascal.) The real strength of the editor is in its integration with the compiler. If the compiler finds an error in your source code, it alerts you to the fact. If you choose, the editor then loads automatically, places the cursor on the offending line, prompts you (in English) as to what kind of error it found, and lets you fix your mistake.

***Wizards** are quick to understand that mastery of any language carries a reciprocal effect.*

The compiler supports all standard Pascal data types: Char, Boolean, Integer (16-bit), Long Integer (32-bit), Real (floating point), Array, Set, Record, Pointer, and File, and adds a String type. Unfortunately, Personal Pascal does not support READ and WRITE operations in connection with the File type, so procedures for using disk files are less than straightforward. The compiler supports a powerful "debugging" mode—if a program compiled in this mode crashes when run, a message appears identifying the source line that caused the failure.

Personal Pascal offers many convenient functions for accessing the GEM window, menu, dialogue and control box, event-handling, interprogram message-passing, text, and graphics routines. Unfortunately, OSS has chosen to call some of the GEM routines by unusual names—frustrating when working with other documents that follow Atari's conventions, and frustrating because it means that Personal Pascal programs aren't self-documenting from a GEM perspective.

In addition, no attempt is made by the Personal Pascal documentation to distinguish between Virtual Device Interface and Applications Environment Services calls—a distinction that may make little difference to the novice, but will slow down the experienced GEM programmer. If the calls you want aren't covered by the built-in functions of Personal Pascal, you can, with a little skill and the proper documentation, build your own. Generic function calls to VDI and AES, as well as GEMDOS, BIOS, and XBIOS are included, making most operations a simple matter of supplying parameters as needed. (All these calls are well-documented in two books from Abacus Software/Data Becker: *Atari ST Internals* and *Atari ST GEM Programmer's Reference*).

Functions of the compiler also permit you to link in routines written in C and assembler. You will need a C compiler or 68000 assembler to write such routines, of course.

Personal Pascal supports modular compilation, permitting you to compose a program in several parts, compile them separately, then tie them together via the linker. Modular compilation assists in the creation of precompiled routine libraries, and improves productivity by not forcing you to recompile a whole program each time you add a section or fix a tiny error. (Linking is much faster than compilation.)

Summary

Though Personal Pascal lacks some of the power and flexibility of C and assembler, it is a more-than-adequate tool for serious programming on the ST. Programs written in Personal Pascal execute quickly, and I would think the language appropriate for any application that doesn't require "arcade game" performance. Given its solid and efficient design, built-in programming aids, solid manufacturer support, fair documentation, and low ($74.95) price, Personal Pascal stands out as an exceptionally useful tool for the serious student and hobbyist. ■

Atari rocks Guitar Showcase with MIDI Connection; Music Studio from Activision

Sound Chip

By JOHN B. JAINSCHIGG

Walking into Guitar Showcase from the heat of San Jose's noonday summer sun, I flashed on the feeling of being back home. When I was a kid, I used to hang out on New York's "Music Strip," just window-shopping and getting into hardware I knew I couldn't afford and didn't deserve. There's a smell to a good music store—a smell of wood, brass, steel, and aspiration—and Guitar Showcase had so much of it that by the time I walked up to the counter and asked for Ken, the manager, I had a grin on my face that only my reptile brain could explain.

I was there on a tip from Atari Marketing's Bryan Kerr, who'd said that Guitar Showcase was into "something interesting." I ought to check it out, he said. Ok, I thought, spend the afternoon in a first-class music store. . .twist my arm! So there I was, being directed upstairs to the keyboard department, about to see "something interesting."

Blow me away. . .I mean, so cool it should be classified. A primo Roland keyboard controller, MIDI-ed thru to a rack-mounted mixer and Yamaha DX-7 synthesizer and who knows what else. . .the whole thing a symphony of jet-black and chrome and green equalizer meters and vicious little, red LEDs . . .and sitting in the middle of this assemblage, controlling the whole thing, get this: a 520ST, MIDI-ed in and screen glowing.

It was running Hybrid Arts software, casually playing slap-bass runs out the DX-7—runs no human could ever perform—and kinda, you know, making it look easy. It sent shivers up my spine. I mean, who needs Kelly McGillis in the cockpit of an F-14?

Buy One Today!

Do you folks know about MIDI? If not, get hip: MIDI, the Musical Instrument Digital Interface, is a high-speed serial standard defining hardware, protocol, and coding that lets computers and musical instruments (and computers *in* musical instruments) talk to and control each other.

MIDI is why your ST has those little DIN plugs in the side (520ST) or back (1040ST). MIDI is the reason why anybody with an interest in music: student, weekend player, studio jock, sideperson, composer, arranger, or lyricist, who doesn't own an Atari ST computer MUST GO OUT AND BUY ONE RIGHT NOW!! (I'll wait.)

Need some more convincing? Okay, imagine this. You've got your ST hooked up through the MIDI port to an inexpensive polyphonic keyboard synthesizer. For those who say "Whoa! Expensive!"—we're talking a little more than two bills for the synth (Japan, Inc. strikes again!) and maybe another bill for MIDI-controller software (kind of like a telecommunications program). You get everything fired up, set the MIDI program to "record" on track #1 (like a tape recorder), and just start playing.

Play for a while, until you've got a riff you like. Then pop over to the computer. Click with the mouse and what you've played comes up on the high-res screen as a score. Play with it—clip out bits you like, alter them, double them up, maybe add a few dynamics. Then set the program to "play," and listen as the synthesizer comes back at you with your tune!

> ***"The ST MIDI market is only now beginning to heat up, and we expect to see some absolutely amazing things at the NAMM show."***

But don't stop there, add another track—edit and paste it in. Play the two tracks back simultaneously. In fact, you should be able to get at least four to eight tracks out of this kind of setup if

your synth is set for pure tones. If you want multiple "instruments," you may have to get yourself another couple of synthesizers. But that's OK, too, with the proper software, your ST should be able to network up to 16 (yes, folks—real time!).

In fact, synths are just the beginning. Everything's MIDI-compatible nowadays: drum machines, pitchriders (neat little boxes that let you use a guitar or flute, for example, to generate MIDI information), you name it.

Major Commitment to Computers

The professionals at Guitar Showcase saw the writing on the wall a while ago. They realized that pretty soon, the computer would be thought of as an indispensable tool for anybody whose musical aspirations rose higher than playing "chopsticks." And, unlike many music stores, they've made a major commitment in both floor space and staff expertise to promoting computers as the vital core of the MIDI standard.

They're hot on the ST—the only general-purpose computer that comes with a MIDI interface built in. Guitar Showcase Keyboard Specialist, Mike Abowd, says: "Look at it this way: for a total investment of less than $1000, you can get a music system that's simple enough to help your kids learn to sight-read, powerful enough to do professional composition, arranging, and studio work, and at the heart of it is a powerful computer that you can use to do word-processing, or programming, or accounting, or whatever. You can't beat it!"

Mike knows whereof he speaks. He's been using computers for years, and has seen them come and go. Though ST's are "walking off the shelves" already, Mike views the Atari's ultimate potential as a music computer as having been only barely tapped by present software. "There are good products out now from Hybrid Arts, Activision, and a few other developers. Really useful stuff at a lot of different levels: good for learning, and good for the professional. But it was a long time in coming—the ST MIDI market is only now beginning to heat up, and we expect to see some absolutely amazing things at the January NAMM show." NAMM (National Association of Music Manufacturers) is a yearly convention of musical-instrument, and now computer and software, manufacturers, held in Los Angeles.

Guitar Showcase is currently building a new studio facility that will let them increase their support of computer-music applications. "We're moving the computers and the keyboards down to the front next month, giving them the top spot. And we're getting set to run a series of classes in MIDI for musicians. Trying to get the word out." Mike says.

It's strange (read "cool") to see STs in a music store, but it's obviously the wave of the future. In fact, the biggest problem for the Guitar Showcase staff isn't convincing customers to be interested in the ST and other computers (including the 130XE!) they sell. "People come in here and see an ST controlling the synthesizers, and they dig that. But then they want to know all about the word processors and database programs, too! We're computer experts in our own way, but we can't keep track of all this software!" laughs Mike. I guess that's the price of power.

For less than $1000, *you can get a music system that's simple enough to help your kids learn to sight-read, powerful enough to do professional composition.*

Music Studio

Now, here is a musician's look at Activision's *Music Studio* for the 130XE. A ground-breaking educational tool and a programming tour-de-force, *Music Studio* will be a bit of a disappointment to the professional musician or composer who makes stringent demands on its user interface. Students and hobbyists, however, will surely find *Music Studio* a valuable addition to their music software libraries.

At first glance, Atari 8-bit home computers would seem perfect tools for music composition and arranging. Certainly, the processing power, graphics, event-timing, and sound-producing capabilities of the Atari provide the basic raw materials for serious composing tools to draw on. Still, if the 8-bit version of Activision's *Music Studio* is any indication, the state-of-the-art in Atari music processing has yet to realize its full potential.

That is not to say that the program, designed by Audio Light, Inc., doesn't have some good things going for it. Like *Music Construction Set*, *Bank Street Musicwriter*, and similar products, *Music Studio* lets you enter, edit, print out, and play back compositions via a joystick-driven graphic interface employing standard musical notation.

For those who can't sight-read, or who prefer a less rigid approach to composition, an alternative means of music entry, called "music painting," is also supported. Here, the pitch, duration, and tone quality of notes are defined by "painting" bars of different colors at various positions on the staff, creating a kind of chromatic "piano roll." It's fun, and what's more, *Music Studio* can convert "music paintings" to standard notation—no mean feat—for further editing and study.

The Musical Palette

The program takes the role of tone quality quite a bit more seriously than competing products. It offers an initial "palette" of 16 musical instrument

***The pitch,** duration, and tone quality of notes are defined by "painting" bars of different colors on the staff.*

sounds (including percussion) that are assigned on a note-by-note basis while composing.

Up to three instruments can play simultaneously (the program supports only three of the Atari's four "voices"), and all can be used in the scope of a single composition. It is thus theoretically possible to write a song that begins with a progression of "piano" chords, switches into a trio passage for "flute," "violin," and "guitar," and concludes with a duet for "tuba" and "tambourine."

Moreover, if the preset instrument sounds don't suit, new sounds can be designed at will, and modified "sound palettes" saved to disk. Sound design facilities, patterned after a synthesizer control panel, let you describe an instrument effect in terms of volume change over time (ADSR (Attack, Decay, Sustain, Release) rate and volume envelope modification to you electronic music hackers). That *Music Studio* can control up to three such effects simultaneously on playback is a programming tour-de-force.

Limitations

Unfortunately, even with all these nifty features, *Music Studio* is still flawed in certain fundamental ways. Though the grand staff is large enough to be legible (another improvement over some competing packages), the graphic sophistication of the music editor leaves much to be desired from the composer's point of view.

For example, all notes, regardless of duration, occupy a fixed amount of horizontal space on the staff. This gives passages containing many short notes a curious, "stretched-out" look that defeats a musician's sight-reading instincts. More annoying, the program interprets and plays back your music primarily according to this rigid spatial framework, ignoring certain timing and voicing cues implicit in the note values themselves.

Because the program doesn't really think in terms of measures or voices, it can't dynamically rectify note-spacing as a composition evolves. Nor does it provide truly adequate editing tools for doing so by hand. Editing is limited to moving and copying sections of the grand staff as a whole; moving individual notes or sections of a single voice means erasing and redrawing.

These limitations force the composer to think "vertically" instead of horizontally, concentrating on harmony instead of melodic movement. Sketching in a bass pattern and erecting a syncopated melody over it is a task only the most patient musician will care to undertake with *Music Studio*.

Music Studio comes on a double-sided disk—one side for Atari, the other for Commodore 64, and never the twain shall meet. Unfortunately, its manual is not similarly divided. Instructions for both machines are combined under each topic heading, and the manual is unindexed. Luckily, the program itself is fairly easy to use—its on-screen icons were well chosen and its various functions fit together fairly seamlessly.

In summary, the program is a definite improvement over other offerings in its genre. It is not, however, the responsive, musical "sketchpad" serious amateur composers have been waiting for.

Next issue: Tim Onosko will lead us into the world of MIDI hardware and software, and we'll learn something about the nuts and bolts of the MIDI protocol itself. Meanwhile, stay tuned. ■

Music Studio

System and price: Atari 400/800/130XE; $39.95

Summary: Easy to use music program with some limitations.

Manufacturer:
Activision, Inc.
P.O. Box 7287
Mountain View, CA 94039
(415) 960-0410

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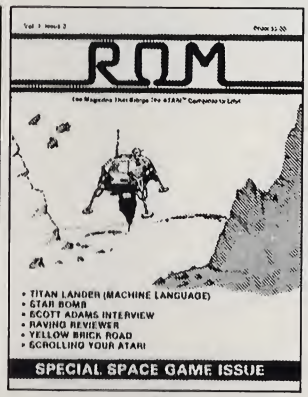

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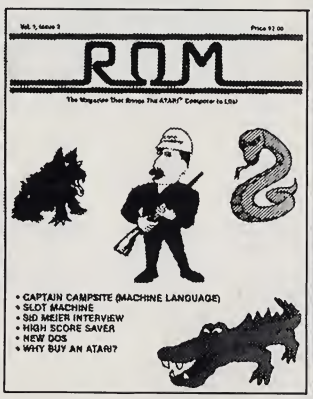

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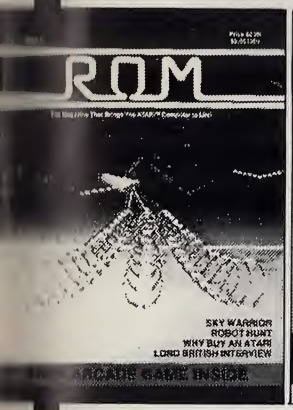

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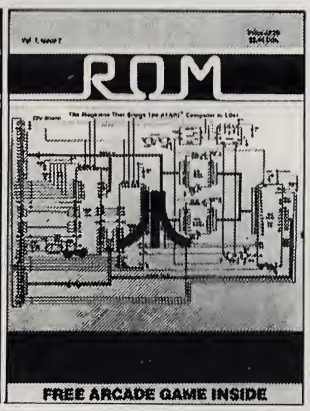

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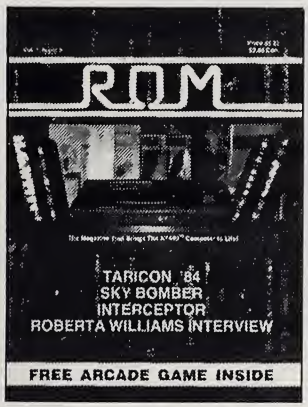

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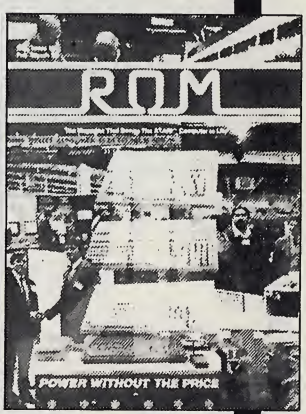

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